

3 fragments + notes

Cartesian Linguistics

A CHAPTER IN THE
HISTORY OF RATIONALIST THOUGHT



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Introduction

A brief, and sufficiently accurate, description of the intellectual life of the European races during the succeeding two centuries and a quarter up to our own times is that they have been living upon the accumulated capital of ideas provided for them by the genius of the seventeenth century.

A. N. Whitehead, *Science and the Modern World*

Whitehead's often quoted remark, cited above, provides a useful background for a discussion of the history of linguistics in the modern period. As applied to the theory of language structure, his assessment is quite correct with regard to the eighteenth and early nineteenth centuries. Modern linguistics, however, has self-consciously dissociated itself from traditional linguistic theory and has attempted to construct a theory of language in an entirely new and independent way. The contributions to linguistic theory of an earlier European tradition have in general been of little interest to professional linguists, who have occupied themselves with quite different topics within an intellectual framework that is not receptive to the problems that gave rise to earlier linguistic study or the insights that it achieved; and these contributions are by now largely unknown or regarded with unconcealed contempt. The few modern studies of the history of linguistics have typically taken the position that "tout ce qui est antérieur au XIX^e siècle, n'étant pas encore de la linguistique, peut être expédié en quelques lignes."¹ In recent years, there has been a noticeable reawakening of interest in questions that were, in fact, studied in a serious and fruitful way during the seventeenth, eighteenth, and early nineteenth centuries, though rarely since. Furthermore, this return to classical concerns has led to a rediscovery of much that was well understood in this period—what I will call the period of "Cartesian linguistics," for reasons that will be sketched below.

A careful study of the parallels between Cartesian linguistics and certain contemporary developments can be rewarding in many ways. A full account of them would go well beyond the scope of this essay, and any attempt to give such an account

would, furthermore, be quite premature, in view of the sorry state of the field of the history of linguistics (itself in part a consequence of the disparagement of earlier work that has marked the modern period). I will limit myself here to something less ambitious, namely, a preliminary and fragmentary sketch of some of the leading ideas of Cartesian linguistics with no explicit analysis of its relation to current work that seeks to clarify and develop these ideas. The reader acquainted with current work in so-called "generative grammar" should have little difficulty in drawing these connections for himself.² Questions of current interest will, however, determine the general form of this sketch; that is, I will make no attempt to characterize Cartesian linguistics as it saw itself,³ but rather will concentrate on the development of ideas that have reemerged, quite independently, in current work. My primary aim is simply to bring to the attention of those involved in the study of generative grammar and its implications some of the little-known work which has bearing on their concerns and problems and which often anticipates some of their specific conclusions.

This will be something of a composite portrait. There is no single individual who can be shown, on textual grounds, to have held all the views that will be sketched; perhaps Humboldt, who stands directly in the crosscurrents of rationalist and romanticist thought and whose work is in many ways the culmination as well as the terminal point of these developments, comes closest to this. Furthermore, the aptness of the term "Cartesian linguistics" for these developments in linguistic theory may well be questioned, on several grounds. First, these developments have roots in earlier linguistic work; second, several of the most active contributors to them would surely have regarded themselves as quite antagonistic to Cartesian doctrine (see note 3); third, Descartes himself devoted little attention to language, and his few remarks are subject to various interpretations. Each of these objections has some force. Still, it seems to me that there is, in the period under review here, a coherent and

fruitful development of a body of ideas and conclusions regarding the nature of language in association with a certain theory of mind⁴ and that this development can be regarded as an outgrowth of the Cartesian revolution. In any event, the aptness of the term is a matter of little interest. The important problem is to determine the exact nature of the "capital of ideas" accumulated in the premodern period, to evaluate the contemporary significance of this contribution, and to find ways to exploit it for advancing the study of language.

Creative Aspect of Language Use

Although Descartes makes only scant reference to language in his writings, certain observations about the nature of language play a significant role in the formulation of his general point of view. In the course of his careful and intensive study of the limits of mechanical explanation, which carried him beyond physics to physiology and psychology, Descartes was able to convince himself that all aspects of animal behavior can be explained on the assumption that an animal is an automaton.⁵ In the course of this investigation, he developed an important and influential system of speculative physiology. But he arrived at the conclusion that man has unique abilities that cannot be accounted for on purely mechanistic grounds, although, to a very large extent, a mechanistic explanation can be provided for human bodily function and behavior. The essential difference between man and animal is exhibited most clearly by human language, in particular, by man's ability to form new statements which express new thoughts and which are appropriate to new situations. It is quite easy, in his view, to

understand a machine's being constituted so that it can utter words, and even emit some responses to action on it of a corporeal kind, which brings about a change in its organs; for instance, if

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it is touched in a particular part it may ask what we wish to say to it; if in another part it may exclaim that it is being hurt, and so on. But it never happens that it arranges its speech in various ways, in order to reply appropriately to everything that may be said in its presence, as even the lowest type of man can do.⁵

This ability to use language must not be confused with "natural movements which betray passions and may be imitated by machines as well as manifested by animals." The crucial difference is that automata "could never use speech or other signs as we do when placing our thoughts on record for the benefit of others." This is a specific human ability, independent of intelligence. Thus,

it is a very remarkable fact that there are none so depraved and stupid, without even excepting idiots, that they cannot arrange different words together, forming of them a statement by which they make known their thoughts; while, on the other hand, there is no other animal, however perfect and fortunately circumstanced it may be, which can do the same.

Nor can this distinction between man and animal be based on peripheral physiological differences. Thus Descartes goes on to point out that

it is not the want of organs that brings this to pass, for it is evident that magpies and parrots are able to utter words just like ourselves, and yet they cannot speak as we do, that is, so as to give evidence that they think of what they say. On the other hand, men who, being born deaf and dumb, are in the same degree, or even more than the brutes, destitute of the organs which serve the others for talking, are in the habit of themselves inventing certain signs by which they make themselves understood.

In short, then, man has a species-specific capacity, a unique type of intellectual organization which cannot be attributed to peripheral organs or related to general intelligence⁷ and which manifests itself in what we may refer to as the "creative aspect" of

ordinary language use—its property being both unbounded in scope and stimulus-free. Thus Descartes maintains that language is available for the free expression of thought or for appropriate response in any new context and is undetermined by any fixed association of utterances to external stimuli or physiological states (identifiable in any noncircular fashion).⁸

Arguing from the presumed impossibility of a mechanistic explanation for the creative aspect of normal use of language, Descartes concludes that in addition to body it is necessary to attribute mind—a substance whose essence is thought—to other humans. From the arguments that he offers for the association of mind to bodies that "bear a resemblance" to his, it seems clear that the postulated substance plays the role of a "creative principle" alongside of the "mechanical principle" that accounts for bodily function. Human reason, in fact, "is a universal instrument which can serve for all contingencies," whereas the organs of an animal or machine "have need of some special adaptation for any particular action."⁹

The crucial role of language in Descartes's argument is brought out still more clearly in his subsequent correspondence. In his letter to the Marquis of Newcastle (1646), he asserts that "there is no one of our external actions which can assure those who examine them that our body is anything more than a machine which moves of itself, but which also has in it a mind which thinks—excepting words, or other signs made in regard to whatever subjects present themselves, without reference to any passion."¹⁰ The final condition is added to exclude "cries of joy or pain and the like" as well as "all that can be taught to any animal by art."¹¹ He goes on, then, to repeat the arguments in the *Discourse on Method*, emphasizing once again that there is no man so imperfect as not to use language for the expression of his thoughts and no "brute so perfect that it has made use of a sign to inform other animals of something which had no relation to their passions"; and, once again, pointing to the very perfection of animal instinct as an indication of lack of thought and as a

proof that animals are mere automata. In a letter of 1647 to Henry More, he expresses himself in the following terms:

But the principal argument, to my mind, which may convince us that the brutes are devoid of reason, is that, although among those of the same species, some are more perfect than others, as among men, which is particularly noticeable in horses and dogs, taught them, and although all of them make us clearly understand their natural movements of anger, of fear, of hunger, and others of like kind, either by the voice or by other bodily motions, it has never yet been observed that any animal has arrived at such a degree of perfection as to make use of a true language; that is to say, as to be able to indicate to us by the voice, or by other signs, anything which could be referred to thought alone, rather than to a movement of mere nature; for the word is the sole sign and the only certain mark of the presence of thought hidden and wrapped up in the body; now all men, the most stupid and the most foolish, those even who are deprived of the organs of speech, make use of signs, whereas the brutes never do anything of the kind; which may be taken for the true distinction between man and brute.^{12, 13}

In summary, it is the diversity of human behavior, its appropriateness to new situations, and man's capacity to innovate—the creative aspect of language use providing the principle indication of this—that leads Descartes to attribute possession of the creative aspect of language to the principle individual mind to other humans, since he regards this capacity as beyond the limitations of any imaginable mechanism. Thus a fully adequate psychology requires the postulation of a "creative principle" alongside of the "mechanical principle" that suffices to account for all other aspects of the inanimate and animate world and for a significant range of human actions and "passions" as well.

Descartes's observations on language in relation to the problem of mechanistic explanation were elaborated in an interesting study by Cordemoy:¹⁴ His problem in this study is to determine whether it is necessary to assume the existence of other minds,¹⁵

At the opposite pole from the belief in "natural order" is the view that each language contains an arbitrary collection of "patterns" learned through repetition (and "generalization") and forming a set of "verbal habits" or "dispositions." The belief that language structure and language use can somehow be described in these terms underlies much of the modern study of language and verbal behavior, often coupled with a denial of the possibility of useful cross-linguistic generalizations in syntax (see pp. 12-13, above). Like the reliance on a presumed natural order, it has helped foster a neglect of the problem of specifying the "grammatical form" of particular languages or the general abstract schema to which each language must conform.⁵⁶

In summary, one fundamental contribution of what we have been calling "Cartesian linguistics" is the observation that human language, in its normal use, is free from the control of independently identifiable external stimuli or internal states and is not restricted to any practical communicative function, in contrast, for example, to the pseudo language of animals. It is thus free to serve as an instrument of free thought and self-expression. The limitless possibilities of thought and imagination are reflected in the creative aspect of language use. The language provides finite means but infinite possibilities of expression constrained only by rules of concept formation and sentence formation, these being in part particular and idiosyncratic but in part universal, a common human endowment. The finitely specifiable form of each language—in modern terms, its generative grammar (cf. note 39)—provides an "organic unity" interrelating its basic elements and underlying each of its individual manifestations, which are potentially infinite in number.

The dominant view throughout this period is that "les langues sont le meilleur miroir de l'esprit humain."⁵⁷ This virtual identification of linguistic and mental processes is what motivates the Cartesian test for the existence of other minds, discussed above. It finds expression throughout the romantic period. For Friedrich Schlegel, "so unzertrennlich ist Geist und Sprache, so wesentlich

gistic acts: to assert, that is, "to publish some Perception either of the Senses or the Intellect"; or to "publish volitions," that is, to interrogate, command, pray, or wish (p. 224). The first type of sentence serves "to declare ourselves to others"; the second, to induce others to fulfill a need. Continuing in this way, we can analyze the volitional sentences in terms of whether the need is "to have some perception informed" or "some volition granted" (the interrogative and requisitive modes, respectively); the requisitive is further analyzed as imperative or precative, depending on whether the sentence is addressed to inferiors or non-inferiors). Since both interrogatives and requisitives serve "to answer to a need," both types "require a return"—a return in words or deeds, to the requisitive, and in words alone, to the interrogative (p. 293f.).⁶⁶ Thus the framework for the analysis of types of sentences is provided by a certain analysis of mental processes.

Pursuing the fundamental distinction between body and mind, Cartesian linguistics characteristically assumes that language has two aspects. In particular, one may study a linguistic sign from the point of view of the sounds that constitute it and the characters that represent these signs or from the point of view of their "signification," that is, "la manière dont les hommes s'en servent pour signifier leurs pensées" (*Grammaire générale et raisonnée*, p. 5). Cordenoy announces his goal in similar terms (*op. cit.*, Preface): "je fais en ce discours un discernement exact de tout ce qu'elle [la Parole] tient de l'Âme, et de tout ce qu'elle emprunte du Corps." Similarly, Lamy begins his rhetoric by distinguishing between "l'ame des paroles" (that is, "ce qu'elles ont de spirituel," "ce qui nous est particulier"—the capacity of expressing "les idées") from "leur corps" ("ce qu'elles ont de corporel," "ce que les oysceaux qui imitent la voix des hommes ont de commun avec nous," namely, "les sons, qui sont les signes des idées").

In short, language has an inner and an outer aspect. A sentence can be studied from the point of view of how it expresses a

thought or from the point of view of its physical shape, that is, from the point of view of either semantic interpretation or phonetic interpretation.

Using some recent terminology, we can distinguish the "deep structure" of a sentence from its "surface structure." The former is the underlying abstract structure that determines its semantic interpretation; the latter, the superficial organization of units which determines the phonetic interpretation and which relates to the physical form of the actual utterance, to its perceived or intended form. In these terms, we can formulate a second fundamental conclusion of Cartesian linguistics, namely, that deep and surface structures need not be identical. The underlying organization of a sentence relevant to semantic interpretation is not necessarily revealed by the actual arrangement and phrasing of its given components.

This point is brought out with particular clarity in the Port-Royal *Grammar*, in which a Cartesian approach to language is developed, for the first time, with considerable insight and subtlety.⁶⁷ The principal form of thought (but not the only one—cf. p. 41, below) is the judgment, in which something is affirmed of something else. Its linguistic expression is the proposition, the two terms of which are the "sujet, qui est ce dont on affirme" and the "attribut, qui est ce qu'on affirme" (p. 29). The subject and the attribute may be simple, as in *la terre est ronde*, or complex ("composé"), as in *un habile Magistrat est un homme utile à la République* or *Dieu invisible a créé le monde visible*. Furthermore, in such cases as these, the complex subject and the complex attribute

entferment, au moins dans nostre esprit, plusieurs jugemens dont on peut faire autant de propositions: Comme quand je dis, *Dieu invisible a créé le monde visible*, il se passe trois jugemens dans mon esprit renfermez dans cette proposition. Car je juge premierement que *Dieu est invisible*. 2. *Qu'il a créé le monde*. 3. *Que le monde est visible*. Et de ces trois propositions, la seconde est la principale et l'essentielle de la proposition. Mais la première et la troisième

ne sont qu'incidentes, et ne font que partie de la principale, dont la première en compose le sujet, et la seconde l'attribut (p. 68).

In other words, the deep structure underlying the proposition *Dieu invisible a créé le monde visible* consists of three abstract propositions, each expressing a certain simple judgment, although its surface form expresses only the subject-attribute structure. Of course, this deep structure is implicit only; it is not expressed but is only represented in the mind:

or, ces propositions incidentes sont souvent dans nostre esprit, sans estre exprimées par des paroles, comme dans l'exemple proposé (viz., *Dieu invisible a créé le monde visible*; p. 68).

It is sometimes possible to express the deep structure in a more explicit way, in the surface form, "comme quand je réduis le mesme exemple à ces termes: *Dieu QUI est invisible a créé le monde QUI est visible*" (pp. 68-69). But it constitutes an underlying mental reality—a mental accompaniment to the utterance—whether or not the surface form of the utterance that is produced corresponds to it in a simple, point-by-point manner.

In general, constructions of a noun with a noun in apposition, an adjective, or a participle are based on a deep structure containing a relative clause: "... toutes ces façons de parler enferment le relatif dans le sens, et se peuvent resoudre par le relatif" (p. 69). The same deep structure may be realized differently in different languages, as when Latin has *video canem currentem*, and French *je voy un chien qui court* (pp. 69-70). The position of the relative pronoun in the "proposition incidente" is determined by a rule that converts deep structure to surface structure. We see this, for example, in such phrases as *Dieu que j'ayme*, *Dieu par qui le monde a esté créé*. In such cases,

on met toujours le relatif à la tête de la proposition (quoy que selon le sens il ne deust estre qu'à la fin) si ce n'est qu'il soit gouverné par une preposition [in which case] la preposition precede au moins ordinairement (p. 71).

In the case of each of the sentences just discussed, the deep structure consists of a system of propositions, and it does not receive a direct, point-by-point expression in the actual physical object that is produced. To form an actual sentence from such an underlying system of elementary propositions, we apply certain rules (in modern terms, grammatical transformations). In these examples, we apply the rule preposing the relative pronoun that takes the place of the noun of the incident proposition (along with the preposition that precedes it, if there is one). We may then, optionally, go on to delete the relative pronoun, at the same time deleting the copula (as in *Dieu invisible*) or changing the form of the verb (as in *canis currens*). Finally, we must, in certain cases, interchange the order of the noun and the adjective (as in *inhabite magistrat*).⁶⁸

The deep structure that expresses the meaning is common to all languages, so it is claimed, being a simple reflection of the forms of thought. The transformational rules that convert deep to surface structure may differ from language to language. The surface structure resulting from these transformations does not directly express the meaning relations of the words, of course, except in the simplest cases. It is the deep structure underlying the actual utterance, a structure that is purely mental, that conveys the semantic content of the sentence. This deep structure is, nevertheless, related to actual sentences in that each of its component abstract propositions (in the cases just discussed) could be directly realized as a simple propositional judgment.

The theory of essential and incident propositions, as constituent elements of deep structure, is extended in the Port-Royal *Logique*⁶⁹ with a more detailed analysis of relative clauses. There, a distinction is developed between *explicative* (nonrestrictive or appositive) and *determinative* (restrictive) relative clauses. The distinction is based on a prior analysis of the "comprehension" and "extension" of "universal ideas,"⁷⁰ in modern terms, an analysis of meaning and reference. The comprehension of an idea is the set of essential attributes that define it, together with what-

be analyzed in a similar way.⁷⁴ If the underlying embedded proposition is interrogative, it is the particle *si* rather than *que* that is introduced by the transformational rule, as in *on m'a demandé si je pourrais faire cela*, where the "discours qu'on rapport" is *Pouvez-vous faire cela?* Sometimes, in fact, no particle need be added, a change of person being sufficient, as in *Il m'a demandé: Qui estes-vous?* as compared with *Il m'a demandé; qui j'estois* (p. 113).

Summarizing the Port-Royal theory in its major outlines, a sentence has an inner mental aspect (a deep structure that conveys its meaning) and an outer, physical aspect as a sound sequence. Its surface analysis into phrases may not indicate the significant connections of the deep structure by any formal mark or by the actual arrangement of words. The deep structure is, however, represented in the mind as the physical utterance is produced. The deep structure consists of a system of propositions, organized in various ways. The elementary propositions that constitute the deep structure are of the subject-predicate form, with simple subjects and predicates (i.e., categories instead of more complex phrases). Many of these elementary objects can be independently realized as sentences. It is not true, in general, that the elementary judgments constituting the deep structure are affirmed when the sentence that it underlies is produced; explicative and determinative relatives, for example, differ in this respect. To actually produce a sentence from the deep structure that conveys the thought that it expresses, it is necessary to apply rules of transformation that rearrange, replace, or delete items of the sentence. Some of these are obligatory, further ones optional. Thus *Dieu qui est invisible a créé le monde qui est visible* is distinguished from its paraphrase, *Dieu invisible a créé le monde visible*, by an optional deletion operation, but the transformation that substitutes a relative pronoun for the noun and then preposes the pronoun is obligatory.

This account covers only the sentences based exclusively on judgments. But these, although the principal form of thought,

do not exhaust the "operations de nostre esprit," and "on y doit encore rapporter les conjunctions, disjonctions, et autres semblables operations de nostre esprit; et tous les autres mouvements de nostre ame; comme les desirs, le commandement, l'interrogation, etc." (p. 29). In part, these other "forms of thought" are signified by special particles such as *non*, *vel*, *si*, *ergo*, etc. (pp. 137-138). But with respect to these sentence types as well, an identity of deep structure may be masked through divergence of the transformational means whereby actual sentences are formed, corresponding to intended meanings. A case in point is interrogation. In Latin, the interrogative particle *ne* "n'a point d'objet hors de nostre esprit, mais marque seulement le mouvement de nostre ame, par lequel nous souhaitons de sçavoir une chose" (p. 138). As for the interrogative pronoun, "ce n'est autre chose qu'un pronom, auquel est jointe la signification de *ne*, c'est a dire, qui outre qu'il tient la place d'un nom, comme les autres pronoms, marque plus ce mouvement de nostre ame, qui veut sçavoir une chose, et qui demande d'en estre instruite" (p. 138). But this "mouvement de l'ame" can be signified in various ways other than by the addition of a particle, for example, by vocal inflection or inversion of word order, as in French, where the pronominal subject is "transported" to the position following the person marker of the verb (preserving the agreement of the underlying form). These are all devices for realizing the same deep structure (pp. 138-139).

Notice that the theory of deep and surface structure as developed in the Port-Royal linguistic studies implicitly contains recursive devices and thus provides for infinite use of the finite means that it disposes, as any adequate theory of language must. We see, moreover, that, in the examples given, the recursive devices meet certain formal conditions that have no a priori necessity. In both the trivial cases (e.g., conjunction, disjunction, etc.) and the more interesting ones discussed in connection with relatives and infinitives, the only method for extending deep structures is by adding full propositions of a basic subject-

predicate form. The transformational rules of deletion, rearrangement, etc., do not play a role in the creation of new structures. The extent to which the Port-Royal grammarians may have been aware of or interested in these properties of their theory is, of course, an open question.

In modern terms, we may formalize this view by describing the syntax of a language in terms of two systems of rules: a *base system* that generates deep structures and a *transformational system* that maps these into surface structures. The base system consists of rules that generate the underlying grammatical relations with an abstract order (the rewriting rules of a phrase-structure grammar); the transformational system consists of rules of deletion, rearrangement, adjunction, and so on. The base rules allow for the introduction of new propositions (that is, there are rewriting rules of the form: $A \rightarrow \dots S \dots$, where S is the initial symbol of the phrase-structure grammar that constitutes the base); there are no other recursive devices. Among the transformations are those which form questions, imperatives, etc., when the deep structure so indicates (i.e., when the deep structure represents the corresponding "mental act" in an appropriate notation).⁷⁵

The Port-Royal grammar is apparently the first to develop the notion of phrase structure in any fairly clear way.⁷⁶ It is interesting, therefore, to notice that it also states quite clearly the inadequacy of phrase-structure description for the representation of syntactic structure and that it hints at a form of transformational grammar in many respects akin to that which is being actively studied today.

Turning from the general conception of grammatical structure to specific cases of grammatical analysis, we find many other attempts in the Port-Royal grammar to develop the theory of deep and surface structure. Thus adverbs are analyzed as (for the most part) arising from "le désir que les hommes ont d'abréger le discours," thus as being elliptical forms of preposition-noun constructions, for example, *sapienter* for *cum sapientia* or *botie*

for *in hoc die* (p. 88). Similarly, verbs are analyzed as containing implicitly an underlying copula that expresses affirmation; thus, once again, as arising from the desire to abbreviate the actual expression of thought. The verb, then, is "*un mot dont le principal usage*" *est de signifier l'affirmation*: c'est à dire, de marquer que le discours où ce mot est employé, est le discours d'un homme qui ne conçoit pas seulement les choses, mais qui en juge et qui les affirme" (p. 90). To use a verb, then, is to perform the act of affirming, not simply to refer to affirmation, as an "objet de nostre pensée," as in the use of "quelques noms qui signifient aussi l'affirmation; comme *affirmans, affirmatio*" (p. 90). Thus the sentence *Petrus vitit* or *Pierre vit* has the meaning of *Pierre est vivant* (p. 91), and, in the sentence *Petrus affirmat*, "*affirmat est la mesme chose que est affirmans*" (p. 98). It follows, then, that in the sentence *affirmo* (in which subject, copula, and attribute are all abbreviated in a single word), two affirmations are expressed: one, regarding the act of the speaker in affirming, the other, the affirmation that he attributes (to himself, in this case). Similarly, "*le verbe nego . . . contient une affirmation et une negation*" (p. 98).⁷⁸

Formulating these observations in the framework outlined above, what the Port-Royal grammarians are maintaining is that the deep structure underlying a sentence such as *Peter loves or God loves mankind* (*Logic*, p. 108) contains a copula, expressing the affirmation, and a predicate (*loving, loving mankind*) attributed to the subject of the proposition. Verbs constitute a subcategory of predicates; they are subject to a transformation that causes them to coalesce with the copula into a single word.

The analysis of verbs is extended in the *Logic*, where it is maintained (p. 117) that, despite surface appearances, a sentence with a transitive verb and its object "expresses a complex proposition and in one sense two propositions." Thus we can contradict the sentence *Brutus killed a tyrant* by saying that Brutus did not kill anyone or that the person whom Brutus killed was not a tyrant. It follows that the sentence expresses the proposition that

rich to bear the burden of justification. Although the examples of deep structure that are given in abundance often seem quite plausible, they are unsatisfying, just as modern linguistic descriptions, though often quite plausible in their analysis of particular utterances into phonemes, morphemes, words, and phrases, remain unsatisfying, and for the same reason. In neither case do we have an underlying hypothesis as to the general nature of language that is sufficiently strong as to indicate why just these and not other descriptions are selected by the child acquiring the language or the linguist describing it, on the basis of the data available to them.¹⁰⁵

What is more, there is little recognition in philosophical grammar of the intricacy of the mechanisms that relate deep to surface structure, and, beyond the general outlines sketched above, there is no detailed investigation of the character of the rules that appear in grammars or the formal conditions that they satisfy. Concomitantly, no clear distinction is made between the abstract structure underlying a sentence and the sentence itself. It is, by and large, assumed that the deep structure consists of actual sentences in a simpler or more natural organization and that the rules of inversion, ellipsis, and so on, that form the full range of actual sentences simply operate on these already formed simple sentences. This point of view is explicit, for example, in Du Mar-sais's theory of syntax and construction, and it is undoubtedly the general view throughout.¹⁰⁶ The totally unwarranted assumption that a deep structure is nothing other than an arrangement of simple sentences can be traced to the Cartesian postulate that, quite generally, the principles that determine the nature of thought and perception must be accessible to introspection and can be brought to consciousness, with care and attention.

Despite these shortcomings, the insights into the organization of grammar that were achieved in Cartesian linguistics remain quite impressive, and a careful study of this work can hardly fail to prove rewarding to a linguist who approaches it without prejudice or preconceptions as to the a priori limitations on permitted

linguistic investigation. Beyond these achievements, the universal grammarians of the seventeenth and eighteenth centuries have made a contribution of lasting value by the very fact that they posed so clearly the problem of changing the orientation of linguistics from "natural history" to "natural philosophy" and by stressing the importance of the search for universal principles and for rational explanation of linguistic fact, if progress is to be made toward this goal.

Acquisition and Use of Language

We have so far extracted from "Cartesian linguistics" certain characteristic and quite important doctrines regarding the nature of language and have, quite sketchily, traced their development during the period from Descartes to Humboldt. As a by-product of this study of *langue*, and against the background of rationalist theory of mind, certain views emerged as to how language is acquired and used. After a long interlude, these views are once again beginning to receive the attention that they deserve, although their appearance (like the reappearance of the central ideas of transformational grammar) was, in fact, a largely independent development.

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 générale* rather than *grammaire particulière* and which expresses itself in Humboldt's belief that deep analysis will show a common "form of language" underlying national and individual variety.¹⁰⁷ There are, then, certain language universals that set limits to the variety of human language.¹⁰⁸ The study of the universal conditions that prescribe the form of any human language is "grammaire générale." Such universal conditions are not learned; rather, they provide the organizing principles that

make language learning possible, that must exist if data is to lead to knowledge. 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.

In approaching the question of language acquisition and linguistic universals in this way, Cartesian linguistics reflects the concern of seventeenth-century rationalistic psychology with the contribution of the mind to human knowledge. Perhaps the earliest exposition of what was to become a major theme, throughout most of this century, is Herbert of Cherbury's *De Veritate* (1624),¹⁰⁸ in which he develops the view that there are certain "principles or notions implanted in the mind" that "we bring to objects from ourselves . . . [as] . . . a direct gift of Nature, a precept of natural instinct" (p. 133). Although these Common Notions "are stimulated by objects," nevertheless, "no one, however wild his views, imagines that they are conveyed by objects themselves" (p. 126). Rather, they are essential to the identification of objects and the understanding of their properties and relations. Although the "intellectual truths" comprised among the Common Notions "seem to vanish in the absence of objects, yet they cannot be wholly passive and idle seeing that they are essential to objects and objects to them . . . It is only with their aid that the intellect, whether in familiar or new types of things, can be led to decide whether our subjective faculties have accurate knowledge of the facts" (p. 105). By application of these intellectual truths, which are "imprinted on the soul by the dictates of Nature itself," we can compare and combine individual sensations and interpret experience in terms of objects, their properties, and the events in which they participate. Evidently, these interpretive principles cannot be learned from experience in their entirety, and they may be independent of experience altogether. According to Herbert:

[They] are so far from being drawn from experience or observation that, without several of them, or at least one of them,

we could have no experience at all nor be capable of observations. For if it had not been written in our soul that we should examine into the nature of things (and we do not derive this command from objects), and if we had not been endowed with Common Notions, to that end, we should never come to distinguish between things, or to grasp any general nature. Vacant forms, prodigies, and fearful images would pass meaninglessly and even dangerously before our minds, unless there existed within us, in the shape of notions imprinted in the mind, that analogous faculty by which we distinguish good from evil. From where else could we have received knowledge? In consequence, anyone who considers to what extent objects in their external relationship contribute to their correct perception; who seeks to estimate what is contributed by us, or to discover what is due to alien or accidental sources, or again to innate influences, or to factors arising from nature, will be led to refer to these principles. We listen to the voice of nature not only in our choice between what is good and evil, beneficial and harmful, but also in that external correspondence by which we distinguish truth from falsehood, we possess hidden faculties which when stimulated by objects quickly respond to them (pp. 105-106).

It is only by the use of these "inborn capacities or Common Notions" that the intellect can determine "whether our subjective faculties have exercised their perceptions well or ill" (p. 87). This "natural instinct" thus instructs us in the nature, manner, and scope of what is to be heard, hoped for, or desired" (p. 132).

Care must be taken in determining what are the Common Notions, the innate organizing principles and concepts that make experience possible. For Herbert, the "chief criterion of Natural Instinct" is "universal consent" (p. 139). But two qualifications are necessary. First, what is referred to is universal consent among "normal men" (p. 105). That is, we must put aside "persons who are out of their minds or mentally incapable" (p. 139) and those who are "headstrong, foolish, weak-minded and imprudent" (p. 125). And although these faculties "may not ever be entirely absent," and "even in madmen, drunkards, and infants extraordinary internal powers may be detected which minister to their safety" (p. 125), still we can expect to find universal consent to

Common Notions only among the normal, rational, and clear-headed. Second, appropriate experience is necessary to elicit or activate these innate principles; "it is the law or destiny of Common Notions and indeed of the other forms of knowledge to be inactive unless objects stimulate them" (p. 120). In this respect, the common notions are like the faculties of seeing, hearing, loving, hoping, etc., with which we are born and which "remain latent when their corresponding objects are not present, and even disappear and give no sign of their existence" (p. 132). But this fact must not blind us to the realization that "the Common Notions must be deemed not so much the outcome of experience as principles without which we should have no experience at all" and to the absurdity of the theory that "our mind is a clean sheet, as though we obtained our capacity for dealing with objects from objects themselves" (p. 132).

The common notions are "all intimately connected" and can be arranged into a system (p. 120); and although "an infinite number of faculties may be awakened in response to an infinite number of new objects, all the Common Notions which embrace this order of facts may be comprehended in a few propositions" (p. 106). This system of common notions is not to be identified with "reason." It simply forms "that part of knowledge which we were endowed in the primeval plan of Nature," and it is important to bear in mind that "it is the nature of natural instinct to fulfil itself irrationally, that is to say, without foresight." On the other hand, "reason is the process of applying Common Notions as far as it can" (pp. 120-121).

In focusing attention on the innate interpretive principles that are a precondition for experience and knowledge and in emphasizing that these are implicit and may require external stimulation in order to become active or available to introspection, Herbert expressed much of the psychological theory that underlies Cartesian linguistics, just as he emphasized those aspects of cognition that were developed by Descartes and, later, by the English Platonists, Leibniz and Kant.¹¹⁰

The psychology that develops in this way is a kind of Platonism without preexistence. Leibniz makes this explicit in many places. Thus he holds that "nothing can be taught us of which we have not already in our minds the idea," and he recalls Plato's "experiment" with the slave boy in the *Meno* as proving that "the soul virtually knows those things [i.e., truths of geometry, in this case], and needs only to be reminded (animadverted) to recognize the truths. Consequently, it possesses at least the idea upon which these truths depend. We may say even that it already possesses those truths, if we consider them as the relations of the ideas" (§26).¹¹¹

Of course, what is latent in the mind in this sense may often require appropriate external stimulation before it becomes active, and many of the innate principles that determine the nature of thought and experience may well be applied quite unconsciously. This Leibniz emphasizes, in particular, throughout his *Notionaux Essais*:

That the principles of language and natural logic are known unconsciously¹¹² and that they are in large measure a precondition for language acquisition rather than a matter of "institution" or "training" is the general presupposition of Cartesian linguistics.¹¹³ When Corderoy, for example, considers language acquisition (*op. cit.*, pp. 40ff.), he discusses the role of instruction and conditioning of a sort, but he also notices that much of what children know is acquired quite apart from any explicit instruction,¹¹⁴ and he concludes that language learning presupposes possession of "la raison toute entiere; car enfin cette maniere d'apprendre à parler, est l'effet d'un si grand discernement, et d'une raison si parfaite, qu'il n'est pas possible d'en concevoir un plus merveilleux" (p. 59).

Rationalist conclusions reappear with some of the romanticism as well. Thus A. W. Schlegel writes that "on pourrait comparer la raison humaine à une matière infiniment combustible, mais qui néanmoins ne s'embrase d'elle même. Il faut qu'une étincelle soit jetée dans l'âme" ("De l'Étymologie en général," p. 127). Com-

munication with an already formed intellect is necessary for reason to awaken. But external stimulation is only required to set innate mechanisms to work; it does not determine the form of what is acquired. In fact, it is clear "dass dieses Erlernen [of language] durch Mitteilung schon die Fähigkeit, Sprache zu erfinden, voraussetzt" (*Kunstlehre*, p. 234). In a certain sense, language is innate to man; namely, "in echteren philosophischen Sinne, wo alles, was nach der gewöhnlichen Ansicht dem Menschen angeboren scheint, erst durch seine eigene Tätigkeit hervorgebracht werden muss" (*ibid.*, p. 235). While Schlegel's precise intentions, with many such remarks, might be debated, in Humboldt the Platonism with respect to language acquisition is quite clear. For Humboldt, "die Erlernung ist . . . immer nur Wiederzeugung" (*op. cit.*, p. 126). Despite superficial appearances, a language "lässt sich . . . nicht eigentlich lehren, sondern nur im Gemüthe wecken; man kann ihr nur den Faden hingeben, an dem sie sich von selbst entwickelt"; thus languages are, in a sense, "Selbstschöpfungen der Individuen" (p. 50):

Das Sprechlernen der Kinder ist nicht ein Zunehmen von Wörtern, Niederlegen im Gedächtniss, und Wiedernachhalten mit den Lippen, sondern ein Wachsen des Sprachvermögens durch Alter und Übung (p. 21).

Dass bei den Kindern nicht ein mechanisches Lernen der Sprache, sondern eine Entwicklung der Sprachkraft vorgeht, beweist auch, dass, da den hauptsächlichsten menschlichen Kräften ein gewisser Zeitpunkt im Lebensalter zu ihrer Entwicklung angewiesen ist, alle Kinder unter den verschiedenartigsten Umständen ungefähr in demselben, nur innerhalb eines kurzen Zeitraums schwankenden, Alter sprechen und verstehen (p. 72).

In short, language acquisition is a matter of growth and maturation of relatively fixed capacities, under appropriate external conditions. The form of the language that is acquired is largely determined by internal factors; it is because of the fundamental correspondence of all human languages, because of the fact that

"der Mensch überall Eins mit dem Menschen ist," that a child can learn any language (pp. 72-73).¹¹² The functioning of the language capacity is, furthermore, optimal at a certain "critical period" of intellectual development.

It is important to emphasize that seventeenth-century rationalism approaches the problem of learning—in particular, language learning—in a fundamentally nondogmatic fashion. It notes that knowledge arises on the basis of very scattered and inadequate data and that there are uniformities in what is learned that are in no way uniquely determined by the data itself (see note 114). Consequently, these properties are attributed to the mind, as preconditions for experience. This is essentially the line of reasoning that would be taken, today, by a scientist interested in the structure of some device for which he has only input-output data. In contrast, empiricist speculation, particularly in its modern versions, has characteristically adopted certain a priori assumptions regarding the nature of learning (that it must be based on association or reinforcement, or on inductive procedures of an elementary sort—e.g., the taxonomic procedures of modern linguistics, etc.) and has not considered the necessity for checking these assumptions against the observed uniformities of "output"—against what is known or believed after "learning" has taken place. Hence the charge of a priorism or dogmatism often leveled against rationalistic psychology and philosophy of mind seems clearly to be misdirected. For further discussion, see the references of note 110.

The strong assumptions about innate mental structure made by rationalistic psychology and philosophy of mind eliminated the necessity for any sharp distinction between a theory of perception and a theory of learning. In both cases, essentially the same processes are at work; a store of latent principles is brought to the interpretation of the data of sense. There is, to be sure, a difference between the initial "activation" of latent structure and the use of it once it has become readily available for the interpretation (more accurately, the determination) of experience.

einander dasselbe Glied der Kette ihrer sinnlichen Vorstellungen und inneren Begriffserzeugungen berühren, dieselbe Taste ihres geistigen Instruments anschlagen, worauf alsdann in jedem entsprechenden, nicht aber dieselben Begriffe hervorspringen (p. 213).

In short, speech perception requires internal generation of a representation both of the signal and the associated semantic content.

Contemporary research in perception has returned to the investigation of the role of internally represented schemata or models¹²⁸ and has begun to elaborate the somewhat deeper insight that it is not merely a store of schemata that function in perception but rather a system of fixed rules for generating such schemata.¹²⁹ In this respect too, it would be quite accurate to describe current work as a continuation of the tradition of Cartesian linguistics and the psychology that underlies it.

Summary

Returning to the remark of Whitehead's that initiated this discussion, it seems that after a long interruption, linguistics and cognitive psychology are now turning their attention to approaches to the study of language structure and mental processes which in part originated and in part were revitalized in the "century of genius" and which were fruitfully developed until well into the nineteenth century. The creative aspect of language use is once again a central concern of linguistics, and the theories of universal grammar that were outlined in the seventeenth and eighteenth centuries have been revived and elaborated in the theory of transformational generative grammar. With this renewal of the study of universal formal conditions on the system of linguistic rules, it becomes possible to take up once again the search for deeper explanations for the phenomena found in par-

ticular languages and observed in actual performance. Contemporary work has finally begun to face some simple facts about language that have been long neglected, for example, the fact that the speaker of a language knows a great deal that he has not learned and that his normal linguistic behavior cannot possibly be accounted for in terms of "stimulus control," "conditioning," "generalization and analogy," "patterns" and "habit structures," or "dispositions to respond," in any reasonably clear sense of these much abused terms. As a result, a fresh look has been taken, not only at language structure, but at the preconditions for language acquisition and at the perceptual function of abstract systems of internalized rules. I have tried to indicate, in this summary of Cartesian linguistics and the theory of mind from which it arose, that much of what is coming to light in this work was foreshadowed or even explicitly formulated in earlier and now largely forgotten studies.

It is important to bear in mind that the survey that has been presented here is a very fragmentary and therefore in some ways a misleading one. Certain major figures—Kant, for example—have not been mentioned or have been inadequately discussed, and a certain distortion is introduced by the organization of this survey, as a projection backwards of certain ideas of contemporary interest rather than as a systematic presentation of the framework within which these ideas arose and found their place. Thus similarities have been stressed and divergences and conflicts overlooked. Still, even such a fragmentary survey as this does indicate, it seems to me, that the discontinuity of development in linguistic theory has been quite harmful to it and that a careful examination of classical linguistic theory, with its accompanying theory of mental processes, may prove to be an enterprise of considerable value.

Notes

1. M. Grammont, *Revue des langues Romanes*, vol. 60, p. 439. Quoted in G. Harnois, "Les théories du langage en France de 1660 à 1821," *Études Françaises*, vol. 17 (1929). Harnois in essence agrees, holding that earlier linguistics hardly merits the name "science" and that he is engaged in an "histoire de la linguistique, avant qu'il y ait une linguistique." Similar views have been widely voiced.
2. By a "generative grammar" I mean a description of the tacit competence of the speaker-hearer that underlies his actual performance in production and perception (understanding) of speech. A generative grammar, ideally, specifies a pairing of phonetic and semantic representations over an infinite range; it thus constitutes a hypothesis as to how the speaker-hearer interprets utterances, abstracting away from many factors that interweave with tacit competence to determine actual performance. For recent discussion, see Katz and Postal, *An Integrated Theory of Linguistic Descriptions* (Cambridge, M.I.T. Press, 1964); Chomsky, *Current Issues in Linguistic Theory* (The Hague, Mouton and Co., 1964); *Aspects of the Theory of Syntax* (Cambridge, M.I.T. Press, 1965).
3. Nor should it be assumed that the various contributors to what I will call "Cartesian linguistics" necessarily regarded themselves as constituting a single "tradition." This is surely not true. With the construct "Cartesian linguistics," I want to characterize a constellation of ideas and interests that appear in the tradition of "universal" or "philosophical grammar," which develops from the Port-Royal *Grammaire générale et raisonnée* (1660); in the general linguistics that developed during the romantic period and its immediate aftermath; and in the rationalist philosophy of mind that in part forms a common background for the two. That universal grammar has Cartesian origins is a commonplace; Sainte-Beuve, for example, refers to the Port-Royal theory of grammar as "une branche du Cartésianisme que Descartes n'avait pas lui-même poussée" (*Port-Royal*, vol. III, 1888, p. 539). An