

INTERPRETATION

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VOLITIONAL ANTICIPATION AND POPULAR WISDOM IN DESCARTES

RICHARD B. CARTER

Introduction

In his 1759 *Discours Préliminaire de L'Encyclopédie*, D'Alembert reminds us that Descartes is a teacher of revolutionaries and a founder of the best and most just social order the world has ever seen. He identifies this as Descartes' major contribution to philosophy, and says it outweighs all the contributions of his illustrious successors. He then immediately continues his notice on Descartes by identifying him as the discoverer of the method of "indeterminates" in science—that is, as the discoverer of the way to apply analytic mathematics to the solution of physical problems. This present paper attempts to show how these two contributions are related. The one contribution is the foundation of a new social order which is more just than any before it. The other, mathematical, contribution is thus the offering of the man who is also the profound investigator of the relation between the freedom of the will—where volition is a *mental* power—and the determination of volition by knowledge (*Meditatio IV*); the mathematical contributor is also the investigator of the epistemological grounds for philosophic optimism concerning the possibility that each man, if he will only exercise "*sa raison*"—his *own* reason—can arrive at truth both in the sciences and in the conduct of life. (*Meditatio III, IV*)

In the first section of this paper, we will examine Descartes' method of "indeterminates" in science, so far as that method bears on his doctrine of free will and the determinateness of knowledge. In the second section, (pp. 84 ff.) we continue with a close analysis of Descartes' concept of "the objective reality of an idea," and then consider (p. 91) how that concept relates to his central doctrine that the excess of the extent of free will over understanding is the principal source of human error. This leads us (p. 93) to his

*This article represents an abstract of the author's manuscript, *Natural and Human Law: An Introduction to Descartes' Political Science*, in progress. All Descartes citations are from Adam et Tannery, *Oeuvres de Descartes*, XII Vol. & supp., Léopold Cerf, Paris. The translations are the author's.

arguments concerning his grounds for holding that, since it is not possible that man could be created so as necessarily to err, he must have within him means for correcting his errors—and thus, he must necessarily possess the means to nullify the consequences of that excess of will over understanding. We end this argument by attempting to show (p. 95) how this development implies a doctrine which D'Alembert does well to characterize as being revolutionary.

I. The Method of "Indeterminates"

An oddity which is characteristic of Descartes' thought is that he begins by doubting, first, the existence of his own body. Then he doubts whether anything he sees is true, whether his memory is not false, even whether he has senses, and whether he has not perhaps made up his ideas of body, figure, extension, movement, and place. He proceeds only subsequently to what is generally considered by others to be rather more doubtful and obscure—the existence of God. Analysis—which he tells us (VII, 156, 21-26) is the method of his *Meditationes*—proceeds by examining how effects are related to their causes. Hence, until those initially unknown causes are determined by analysis, their effects are no less doubtful as effects of obscure or unknown causes than their very causes. The orders of knowledge and experience are inverses of one another and what is immediately given is regarded by Descartes as what is questionable, that is, as the undetermined effect of something sought for. Descartes seeks the first principles of all phenomena which, in his hands, are reduced entirely to causes. For Descartes, a principle is a cause. His thinking, and that of the age following him, is characteristically that of the medical clinician.

In Part I of *Les Passions*, the reader sees that for Descartes the soul has the power of attending to, of noticing, one of its perceptions rather than any other and that this power, the soul's primary active power, is at the root of the soul's ability to represent things to itself in one way rather than another and therefore to connect this or that perception with this or that passion. The perception, itself, e.g., of light, is, as we read in *Dioptriques* as well, a "naturally instituted" perception of a motion in the pineal gland—primarily that motion inaugurated by rays of spirits coming from pores whose anterior ends

are the ends of the optic nerves in the back of the eye-ball. Now, the dreams of sleep are visible to the sleeper; hence, for Descartes, they are nothing more and nothing less than the result of a commotion in the spirits of the brain caused by a more or less serious dysfunction in some part of the viscera, e.g. caused by acute indigestion and alcohol. But, what of the "visions of young men" and the "dreams which old men dream" which, alone, make any amelioration of the human condition possible—even medical progress? For that immensely sober man, Descartes, who thinks he explains the Roman Catholic mystery of transubstantiation by means of his own theory of alimentation, any perception, be it a vision of the young or a dream of the old, is the result of a perturbation of the pineal gland; if that vision and that dream is in any way *noticed*, this is because of a perturbation of the pineal gland and that perturbation of the pineal gland can be caused *only* by those streams or rays of spirit which, at some time, initially issued forth from the pores in the interior of the brain. For Descartes, there is no other way. The structure of the body is the precondition for visions as well as vision (just as the conformation of the parts of a heaven are the precondition for *its* light).

Descartes has said of the soul, (*Regulae XII*, X, 415): "but still, there is nothing else to be found in corporeal things altogether similar to it" (*neque enim in rebus corporeis aliquid omnino huic simile invenitur*). In considering vision, we can see an instance of this uniqueness of the soul. For the soul has the power both of perception as well as of representing to itself things which it has *never* seen and which it *knows* it has never seen. It can, as it were, "see" the unseen in so far as it can represent to itself by, e.g., the ciphers of algebra, *exactly and precisely what it knows that it does not know*. That ability, it must never be forgotten, presupposes the conformation of the body which allows it to see the ciphers which the hand has drawn down on paper. As Descartes puts it so clearly in *Regula XVI*:

it is useful to retain all not immediately relevant considerations so that they come forth readily wherever they are needed; and for this end memory seems to have been instituted by nature. But, since memory is often weak . . . the art of writing is most aptly devised, relying on the help of which we need commit nothing further to memory, but leaving the imagination free and whole for present ideas, we draw whatever is to be retained on paper, and this by means of the shortest possible symbols (*notae*). . . (X, ⁴⁵⁴⁻⁵⁵)

This ability to represent the unknown to oneself, to present it to the eye in 'symbolic' form, entails a use of the conformation of the body—involving eye, hand, bones, and blood. The pre-vision of what will be seen, but which is not present, could fairly be called the inner vision of the living human. It is likely this pre-vision which Descartes calls "the light of nature"—e.g., *Meditatio III, passim*. We could not have it unless we had the power to perceive the outer world which presents back to us the work of our hand as we write on paper, or of our tongues as we speak; nor could we have that pre-vision clearly and distinctly unless it could, in the future, be paired with a vision of what we pre-viewed in our pre-vision. And that pre-vision into the future presupposes the power of vision of this body organized in the way that nature has caused it to be organized from the beginning at the moment of conception.

But this power of pre-science, of knowing precisely what it is one does not know, is not magical, nor is it miraculously given us. It presupposes that the nature of things (both in so far as known, as well as merely knowable in whatever far distant future) entails an interconnectedness and order, a pro-vidential ordaining, which permits one to envisage the unknown as being expressible in terms of the already given and known. Hence, the order and method of Cartesian Analysis itself points to a true and substantial ordaining or ordering of a substantially separate subject-world—that of Analysis, *Mathesis Universalis*. If, that is, Analysis proceeds methodically—step by step (*gradatim*), rung by rung—from the given to the sought-for, *then* the physical world is accessible to analytical Method and thought—if and only if that very physical world is a "mediated" structure, a rational construct which is put together step by step, rung by rung (*gradatim*). That substantially separate physical subject-world is the product or effect of an orderly, "continuous, and nowhere interrupted motion" of matter. Descartes says just this in his *Le Monde*.

This designation of "medium," of the condition of mediocrity, is thus *both* a genetic and an epistemological term. In the latter case it refers to that which must be known in order that we can proceed from what is given to what we seek to know, from the *datum* to the *quaesitum*. It is because of the "mean" steps that what is sought is accessible, or, in the terms of the man to whom Descartes refers as "cette belle Analyste," Vieta, those mean steps are the ladder rungs upon which

men ascend from dubious effects to causes—the degree or *gradus* of an equation being literally the number of rungs of the ladder upon which we find ourselves in this ascent. (Descartes takes over this coinage of Vieta's whole cloth—e.g., in *Regula*, X, 463, ^{3 6 7}).

In *Regula XIII* of the *Regulae*, Descartes rejects the syllogistic form of demonstration used by the so-called “Logicians” (*Dialecticos*); elsewhere he says that all that form is good for is the precise revelation of what one already knows, and that it is worthless for the discovery of new truths or, what is primary, for the demonstration of *how* new truths already arrived at were originally discovered. His own analytic method of demonstration is, however, explicitly understood by him as the method of so discovering new truths and demonstrating them, that at one and the same time this method reveals: (a) how they were discovered, (b) just what was discovered, and (c) the exact relations between which things had to be known before the solution *could* be discovered at all. It thus makes manifest all the steps of the demonstration—their *exact* number—and their mutual interconnectedness, interdependency and interrelatedness. This manifestation of the internal structure of the demonstration with respect to the multitude of factors and the order of their mutual dispositions is accomplished primarily by a way of designating the unknown terms of the problem at hand in terms of a suitable representation of the sought-after solution—or, to be more precise, by representing both the knowns and the unknowns as if they were all knowable in light of the potential solution of the problem, as if they were known hypothetically or provisionally in the dim, persistent light of the not-yet-attained but analytically represented solution sought for.

In *Regula XIII*, Descartes denies that he distinguished between two extreme terms and a mean term, *in the way* the Logicians (*Dialecticos*) make this distinction; rather, he considers that (X, 430, ¹¹⁻²²): (1) “in any question, something must be unknown, for otherwise it will be sought for in vain”; (2) “the unknown ought to be uniquely designated [*aliquo modo designatum*], for otherwise we would not be determined on this rather than that subject of investigation”; (3) “it cannot . . . be designated uniquely except by something which is known.” Consonant with this, in setting up a word-problem in algebra we designate the thing sought-for, e.g., by x , and then the other terms of the equation will be, e.g., $2x$, x^2 , $x/6$, or $x+3$, etc.

The way we represent what is unknown—i.e., in terms of what is

known (once again, see *Regula XIII*: X, 430, ¹¹⁻²⁰, where Descartes says: “it cannot . . . be designated uniquely except by something which is known”)—is, so to speak, evolutionary; that is, each successive unknown quantity is “designated uniquely” by the expedient of designating it in terms of a unique *expression* for one particular unknown. Which particular unknown to choose does not seem to be able to be taught by method!¹ The Algebraists cannot, it seems, teach the tyro how to choose what to call the “fundamental” unknown—what, as it were, to choose to express as comprising the bottom rung of the ladder between given and sought-for. To take a definite example, let us suppose that someone has \$3 in nickels, dimes and quarters, with four times as many nickels as quarters and twice as many quarters as dimes; it is then to be determined exactly how many of each he has. The first step is to determine—not so much what is unknown (how many of each is what is unknown)—but the *way of representing* to ourselves what is unknown; then, the further information we are given for the solution of the problem (called by Descartes, the “conditions” or “tenor” of the problem) is also expressed in terms of the unknown. When this is done, then “we are determined on this rather than that subject of investigation.”

It is permissible to view the setting-up of a solution to a word-problem in analysis—including the mixture-problems of ‘lower’ analysis (or algebra), as well as the somewhat less familiar problems of the ‘higher’ analysis, or the calculus of Leibniz or Newton’s physics—as finding the means to the solution. Nor can this use of ‘means’ be called a semantic trick. ‘Ways and Means’ have always had a meaning associated with them which pointed to the figure of a bridge between where we start from, the *data*, and where we wish to end up, the *quaesitum* or question to be answered, what is sought-after.²

To return to the word-problem just proposed—someone has \$3 in nickels, dimes and quarters, with four times as many nickels as quarters, and twice as many quarters as dimes: how many of each does he have?—we let x express the *number* of dimes in the \$3 worth of change. Then $2x$ expresses the *number* of quarters. Ten times the number of dimes, or $10x$, will express the *value* in pennies, i.e., the number of penny-units in x number of dimes, 25 times $2x$ (or $50x$) the *value* of the $2x$ quarters and, finally, since there are four times as many nickels as quarters, $5[4(2x)]$, or $40x$, will express the *value* of

the $4(2x)$ number of nickels. The sum of \$3 will then be expressed as 300 'penny-units,' so that all the terms will now be in the same *unit* of monetary measure. Interconnecting these expressions by means of the appropriate connection (addition), we construct the equation: $10x+50x+40x=300$. When we perform the indicated operations and *add the expressions* for the unknowns together, we get $100x = 300$, i.e., 300 *pennies*. This equation means: "100 times the sought-for number of dimes equals 300 pennies." That is, the term, '300 pennies' appears to be the analogue to the term '100 times the unknown number of dimes.' (The willingness to accept such a confusion of units is, as we shall soon see, a precondition for 'doing' algebra and analysis.) In this last equation, we find that 100 of some quantity, represented by x , is equal to a *known* number of pennies (where x represents the *number* of dimes); then, 100 times the unknown number of dimes being considered equal to the *known* number of pennies, we see that the number of dimes is 3; x has been representing 3. There being 3 dimes, since there are twice as many nickles as quarters, there must be 24 nickles. Checking: 3 dimes = 30¢; 6 quarters = 150¢; and 24 nickles = 120¢. Thus, 30¢+150¢+120¢ = 300¢.

It is necessary to reflect here on the status of the term 300 occurring in the equation, $10x+50x+40x = 300$, by comparing it with the term 300 in the equation $30+150+120 = 300$. For, in the former case, where 300 is the *sum* of three *unknown* terms, we consider that term as known, precisely because we do not have to consider its *expression* in our search for that equation which will express the conditions of the problem. In that former equation, the conditions of the problem, its "tenor," makes the quantity 300 just as much an unknown as is x , the number of dimes. Whereas, in the latter equation, $30+150+120 = 300$, even were we to ask whether the sum were cast correctly, the terms on both sides of the equation would not be being put into question—only the term 300 in so far as it is the *presumptive* sum. In the former case involving the representations for unknowns, the term 300 is a sum of representations or, more accurately, it is a "sum" of actually unknown things represented as if they were known.

This ability we humans have to *express* what we do not know (the precondition for which is quite consciously knowing that we do not know it) comprises our prescience or inner light mentioned above. It

is at least very likely that Descartes' interest, not to say fascination, with order and method derives from his conviction that this analytic order and method grows out of and, indeed, manifests, the essence of, the human intellect in so far as it is capable of solving any problems whatsoever. Furthermore, it is again at least very likely that much of the Cartesian programmatic effort—culminating in the ramified Tree of Philosophy whose three highest branches were, of all things, Medicine, Mechanics, and Ethics—was directed towards a search for the ultimate roots, both physical and metaphysical, of the human ability to solve problems by analysis.

In *Regula XIII*, Descartes discusses the ultimate subject of such expressions $10x$, 300 and the like. He says (X, 431, ³⁻²³):

But, what is more, in order that the sought-for be grasped entirely [*Sed insuper ut quaestio sit perfecta*], we wish for every thing to be so determined that nothing further is sought beyond what can be deduced from the given [*ex datis*] . . . From which it can be easily perceived how [*quomodo*] all the sought-for unknowns not entirely grasped [*omnes quaestiones imperfectae*] can be reduced to ones which are entirely grasped; . . . and it also appears in which way this rule ought to be observed in order to abstract a well understood difficulty from every superfluous concept [*ad difficultatem bene intellectam ab omni superfluo conceptu abstrahendam*], being, in this way, so reduced that we consider ourselves no further concerned with this or that subject, but only with that sort of subject [*in genere*] concerned with magnitudes interconnected in a certain way [*circa magnitudines quasdam inter se componendas*].

This “sort of subject concerned with magnitudes interconnected in a certain way” is *the subject* of Descartes' method—applying equally to the equation $30+150+120 = 300$, (is the sum correct?), to the equation $10x+50x+40x = 300$, (what is x ?), and to such diverse questions as Descartes himself instances (*ibid.*, 431), “of what sort (*qualis*) is the nature of the magnet?” as well as (*ibid.*), “likewise, if someone should ask me exactly what I might think about the nature of sound. . . .” In his phrase, “that sort of subject concerned with magnitudes interconnected in a certain way,” Descartes—specifically including both “the nature of the magnet” and “the nature of sound”—refers to the subject of questions-in-general, i.e., to the seeking concerning seeking. If this reading of Descartes is accurate and sound, “the subject of magnitudes interconnected in a certain way” does not and cannot merely refer to extended substance, *res extensa*, alone. Rather, that phrase must refer to *res extensa* as

existing in a certain qualified way, that is, as *ordained to be known*. But, the realm of *res extensa* is given to us in so far as we are merely sentient creatures. It is only when we “withdraw from our senses” by freely choosing to doubt all the evidence of the senses concerning *res extensa* that we thereby immediately transform that realm into another one—that of *res extensa* as-ordained-to-be-known (rather than merely to be sensed because of our neurophysiology). But, because this transformation requires the volitional act of the soul *par excellence*, doubting, it follows that this transformed realm is a world known indeterminately merely in the universal doubting of sense-evidence; and, as known indeterminately in this volitional act of doubting, we are justified in saying that it is known through “volitional anticipation.” To understand that anticipation, we must next consider Descartes’ doctrine of “the objective reality of an idea.”

To continue with our word-problem; if we are to take the sign for equality seriously, that is, if we are to observe exactly the rule that the units on the two sides of the equality sign must be of the same kind, then, in the equation, $10x+50x+40x = 300$, the *number* of units of which the term 300 is merely the representation must be as unknown as are the number of units of which $10x$ is the representation; 300 is thus *no* more and *no* less than a part of the *expression* of the *given conditions* for the solution of the problem, and it is not intended *at all* as a definite sum of definite units any more than are $10x$, etc. Therefore, since that expression 300 can be intended as a term in the analytic representation of the conditions for the possible solution of a problem, it is theoretically impossible to distinguish that technical analytical use from the apparently ordinary use in a sum such as: $30+150+120 = 300$. Or, to put this yet more sharply: For Descartes the ciphers forming the expression $3-0-0$ are *never* intelligible outside their *specific use* as ways of keeping something in mind; they refer to our human ingenious attempt to solve all those problems which cannot be solved except by using those three ciphers or “symbols.” (Nor should it be overlooked, concerning the specificity of the specific use of these ciphers, that algebra was known for some time as *Specious Arithmetic*, that is, as an arithmetic whose ciphers stood for species—presumably for species of problems which *could* be solved with such and such an expression. Indeed, the expressions of analysis, including such

expressions as both 300 and $e^{xy \log x}$, are used to express nothing other than *species of problems*. This is the definition of analysis.) Those ciphers are analytic place-holders in the search for solutions to all of a certain class of problems; they are, as it were, an entry in the mind's lexicon of engineering-techniques.³

II. The Objective Reality of An Idea

The task of comprehending what Descartes means by his expression, "the objective reality of an idea," is difficult, as it leads the student of Descartes into a peculiarly complex thicket formed partly by the idiomatic Cartesian terminology and partly by scholarship's (usually) laudable conservatism. Concerning this notion, we find assertions on Descartes' part (IX, 62-63) concerning the fact that indivisible substance is of higher order or degree of reality than is divisible substance and hence that *res extensa*—although comprising one of the two substances in the universe—is of a less exalted order of being than is the other substance, *res cogitans*. We find, further, that the concept of an infinite substance has more reality (*entitas, réalité*) than does the concept of finite substance. We find, as well, that by the term, "the material falsity" of ideas, Descartes refers to the interrelation of ideas between themselves, *vis à vis* their rank or rung, whereas, by the term "the formal falsity" of ideas, he refers to our judgment that an idea refers to this or that which is not (usually) an idea. Indeed, our credulity is strained yet further as we find him speaking as if he means to tell us that we come to know all "outside" things which are compounds of simpler elements by means of ideas which are themselves compounds of, compounded of, other ideas, and that compound ideas have more reality than do their individual component ideas and, what is more, that, by the same token, compound things have more entity or reality than do the simpler components of which they are composed. (The only exception is God Who, alone, is an infinite unity.)

But this is, in fact, how Descartes speaks about these matters. He says that the original intellectual causes of our ideas—he calls them "patrons"—have either "formal" reality or "effective" reality—by which he seems to mean formative or effecting reality. What these patron ideas form or effect is consequent, or caused, ideas having no

more than just that amount or degree or rung of objective reality—a sort of reality which only belongs to ideas—which corresponds to the *amount* of formal or effective reality which belongs to their patron ideas. Likewise, in the case of, e.g., a horse whose real presence outside us occasions our idea of a horse, that *idea* of the horse is no less objectively real—no less real in *its* mode of being—than the horse of which it is the idea is itself actually or formally real—in *its* mode of being. The formal reality of the existent horse—in so far as that horse may be thought—measures up to, so to speak, the objective reality of my idea of that horse.

In the situation where we are considering the relation between the idea of a machine in the mind of the inventor and the machine itself, the case is only slightly different, but significantly so. For then, the existing machine which the inventor finally constructs in accordance with his idea of it is caused by his idea of it in a way very similar to that in which logical consequents are caused by their intellectual antecedents. In this case, however, the antecedent, patron, is the idea in the mind of the inventor, but the consequent, effect, is a really existent, working machine 'out there.' In this case, the craft or ingenuity of the inventor contains the formal reality whose "objective artifice" or "objective perfection," (as Descartes terms it), is that of the effective, creative, *idea* of the working machine when it has been built and works perfectly. And, hence, (aside from its purely physical properties), that machine borrows all its actual reality as an actively working *machine* from the ingenuity or artifice of its inventor-craftsman, from the real power of his mind, and thus the work effected by the machine is the ultimate effect or consequence of his idea of his machine. To determine the degree of objective reality of any idea, then, we must, in each case, determine its formal reality as well. That is to say, to grasp clearly the objective reality of any given idea, we will have to analyze it into its absolutely simplest components; then we will find one, and only one, existent—whether that be a patron idea or whether it be a truly existent something in front of us—which will have just the entity which corresponds to the objective reality of our idea—which will be, therefore, a synthetic or compound idea except in the three cases of the ideas of *res extensa*, *res cogitans* and their union. Except in the cases of these three simple ideas, all our ideas are synthetic and their objective realities are, *inter se*, of a higher or lower degree or rank of being, depending on the

number of constituent ideas which compose them.

An example of the present-day influence of this (apparently idiotic) Cartesian notion is to be found in our search for particular neural events which are uniquely correlative to particular consciousness-states. This most certainly is not a causal analysis across the mind-body gap; rather, it is a search for a continuous, and hence potentially synthetic, substratum for consciousness-states. Once the individual elements within that substratum have been established as being in a one-to-one functional relation to successive consciousness-states, the neo-Cartesian researcher will rest assured that the composition of the neural events, their true order and number and degree of intensity, uniquely associates one member out of a series of "physical" causes with each and every mere consciousness-state. The character or true content of individual states is beside the point; all that matters here is that a given state only occur when a given neural event occurs. *What* consciousness-state is to be associated with *what* individual neural event is theoretically (although perhaps not medically) unimportant. This is precisely what Descartes had in mind with respect to the objective reality of consciousness-states or ideas: a given idea has the reality that it does precisely because it is the final member of the unique chain of antecedents to which it belongs.

Concerning these matters, Descartes says, to begin (IX, 132):

And it follows from this that . . . what is more perfect, that is to say, what contains in itself more of reality, cannot be a consequence of and dependent on what is less perfect. Furthermore, this truth is not only clear and evident from the effects which have that reality called actual or formal by the philosophers, but it is also clear and evident in ideas, where one considers only the reality which they call objective. . . .

He then instances a hot stone and its idea, and continues by saying that

although that particular cause does not transmit into my idea any of its actual or formal reality, one should not thereby imagine that this cause must be less real. Rather, it should be known that every idea being a work of the mind, the nature of any idea is such that it requires for itself no other formal reality than what it receives or borrows from thought or the mind—since an idea is only a mode, i.e., a manner or way, of thinking. Now, in order that an idea contain one such objective reality rather than another, it ought, without doubt, to have it from a cause in which there is to be found at least as much formal reality as that idea contains of objective reality. . . . For, that manner of being objectively belongs

entirely to ideas, because of their proper nature, just as, on the other hand, the manner or fashion of being formally belongs to the causes of these ideas (at least to the first and principal ones) by their proper nature. And, although it can happen that one idea gives birth to another. . . . finally we must arrive at a first idea, whose cause must act as a patron or an original. In that patron, all the reality or perfection is contained formally and in effect which is found only objectively or by representation in the ideas stemming from it.

Thus, the objective reality of an idea is just that *in the idea* which, although it belongs to it *as an idea*, is its reality as borrowed from elsewhere. (E.g., in the terms of modern set-theory, the number n is the set of the numbers less than n , so that the very “being” of that set is a dependency on its members, and not on itself, since “no set is a member of itself”; the definition which denominates a cardinal number as being a set having the same multitude of elements as a uniquely distinguished “counter-set” does the same thing, in as much as the counter-sets are these patron ideas and the natural numbers then borrow their objective reality from these!)⁵

To continue, then, Descartes seems to hold that each individual existent thing admits to a unique and distinct degree of reality (*vide* even his early *Regulae: Regula VIII*; X, 392, ¹⁰⁻²²). We find him saying, for instance (IX, 109): “for it is self-evident that it is a greater perfection in not being divisible than in being divisible. So that, if you understand only what is quite perfect in the genus of body, that is not true at all of the true God.” What can we conclude from this passage other than that soul or mind—*res cogitans*—is, in itself, of a higher degree of perfection than is *res extensa*? Furthermore, it follows from this that mind has a sufficient degree of reality, to enable it, *vis à vis* its notions or conceits, to be the eminent⁶ or formal reality from which the ideas such as we construct when we form hypotheses and conceive inventions borrow their objective reality. We have already touched upon the notion of invention. In the case of hypotheses (which are a sort of intellectual invention, one concerned, in Descartes’ mind, with inventing solutions to problems), something similar follows. For, if each and every individual existent thing participates in one, and only one, degree of reality, and if the objective reality of a particular clear and distinct idea exactly corresponds, in the realm of *res cogitans*, to the degree of reality of its object, then, the rank of being of an hypothesis-idea—of an idea which concerns only the possible

existence of something—is determined exclusively from the parts or elements of, or the antecedents to, that idea, i.e., from what the mathematical analysts call the data or the conditions of the problem. Thus, in algebraic equations, the *datum*, i.e., the given, exactly equals the *quaesitum*, i.e., the sought-for or unknown. Indeed, it is by no means at all unlikely that Descartes' doctrine of the objective reality of ideas is his own meta-mathematical analysis of his and Vieta's theory of algebraic equations and transformations.

"Objective reality," as we *today* use that term, is *for Descartes* (but *not* for us) the counterpart to the ideas we have, or may have, of things "outside." For us, today, it concerns things; for Descartes, the term referred to a characteristic of ideas! More precisely, the reality or entity of things is, for Descartes, the counterpart to the objective reality of the ideas of those things. The only exception, one which has been mentioned already, is the situation of a machine and the cunning or ingenuity of the craftsman who invented it; in that case, the real machine "out there" is the objective counterpart to the objective artifice of the idea of that machine in the mind of its inventor.

Since Descartes' time, there has been a great deal of confusion concerning his own distinction between the "objective reality of an idea" and "the objective artifice of a machine." As we today understand the term objective reality, it is what Descartes himself would have understood as the world of artifice, the world of technological civilization—and, it seems, the created world itself, *as* created, i.e., as a natural or divine artifact. In that Descartes was what we might do well to call analytic, and attempted to derive the given as the logical consequence of particular and more intelligible patrons, the very world about him comes to be a sort of general objective counterpart to the particular ingenious hypotheses-ideas of his physics by means of which he tries to understand that world; and those ideas are, as analytic, characterized by their artifice. Thus, for the analytic physicist, all of objective reality (in *our* sense) is the counterpart to his methodically derived ideas: All of reality becomes, step by step, *gradatim*, the objective counterpart to the physicist's methodically achieved analytical hypotheses. Working by means of these mathematical hypotheses, he adds to his store of ideas by deriving equations step by step, *gradatim*; correlative to this methodical procedure, the nature of physical reality will be unfolded

to him step by step, *gradatim*. The goal of this process is a science in which, as Spinoza—that profound scholar of Descartes' thought—has it (*Ethics*; Part II, Prop. IV): “The order and connection of ideas is that of the order and connection of things.” (Spinoza saw clearly that the question of grades, degrees, and levels of beings and ideas was a fundamental one, for, of all things, *Ethics*; that same man also wrote a work connecting, even in its title, the question of the *highest* being, God, and the political order, i.e., his *Theological-Political Tractate*.)

Descartes is very clear as to his conviction that physical reality itself is also structured according to ranks or degrees of being. In the *Responses to the Second Objections* (IX, 105-06), Descartes compares “lower” animals, as effects, with their causes and says: “For, either it is certain that there is definitely not any more perfection in the animals which do not have any reason at all—which is the case also with inanimate bodies—or, if there is any perfection in them, it is certain that it comes to them from elsewhere and the sun, rain and earth are definitely not the total causes of these animals.” He then continues to say that it is irrational to doubt this “on the sole grounds that one does not have any idea of the cause which concurs in the generation of a fly, i.e., a cause having as many degrees of perfection as there are in a fly. . . .” Again, he says (IX, 49) that, “God has not placed me in the rank [*au rang*] of the most noble and perfect things,” and hence, that he is not to be supposed to have all the perfections that exist in the whole universe. Again, (IX, 63), he says there must be some substance in which the objective reality of our ideas of corporeal things is contained formally or eminently or, that such substance may be even “God himself or some other creature more noble than body in which that very objective reality of my ideas is contained eminently.” Again, in Axiom VI of his geometrical proof of God's existence—and what is a “geometrical” proof of God's existence if it does not explicitly reveal the interdependency of the steps or grades between things—(IX, 128), Descartes says that “there is more of objective reality in the idea of substance than in the idea of an accident and more in the idea of infinite substance than in the idea of finite substance.” And, as a final instance—one which explicitly joins the concept of rank of being with his algebraic or analytic considerations—we find him saying in *Rule VIII* of his early *Regulae* (X, 392, ¹⁶⁻²²): “In effect,

whatever constitutes a complete degree [*integrum gradum*] in the series by which it is necessary to pass from relative things to absolute things, or inversely, ought necessarily to be examined first before what follows. But, if, as sometimes happens, many things belong to the same level [*ad eundem gradum pertineant*], it is surely always useful to run through them all in order." Here, Descartes is addressing himself to the methodical analysis of "natural powers" and says, concerning the search for the powers which ultimately cause the specific ratio of incident to refracted angles of light in different media, that

the ratios between the angles of incidence and the angles of refraction depend on the variation of these same angles because of the difference of media; and that variation, in turn, depends on the way in which the ray of light penetrates into all the transparent body; and the knowledge of the property of penetrating into a body presupposes the nature of the action of light to be known also; and, finally, in order to understand the action of light, it is necessary to know generally what a natural power is—and that knowledge is, in that complete series, the last and most absolute term. Thus, when one has seen that clearly by intuition, he should pass by the same degrees [*per eosdem gradus*] . . . and if, in arriving at the second degree [*in secundo gradu*] he does not immediately know the nature of the action of light, he should, following the 7th rule, enumerate all the other natural powers. . . . (*Ibid.*, 394, ²²-395, ⁹)

That "second degree" is, *mathematically*, the second power of the equation from which the whole class of so-called "anaclastic" curves of optics is derived analytically.

Taking this together with arguments from section I, it seems fair to conclude that for Descartes the *gradual* method of reaching truth in the sciences faithfully images, intellectually, the ranks and degrees of the reality about which it is concerned. Furthermore, we can conclude that we have a truly sufficient grasp of something through its idea only if we have arrived at that idea *via* a path which has as many distinct steps, grades, or ranks as the thing has degrees of being.⁷ Truth, for Descartes, is a matter of degree.

From this we are also prepared to find that falsity, as well, will be concerned with this question of the relative rank of the being of ideas and of their respective objects. And, indeed, we find (IX, 180) that ideas are materially false only in so far as "I do not recognize that there is more of reality represented to me by one idea than by another." Thus, for instance, we can consider the idea of cold which

we receive from the senses. Here we really have two distinct ideas—one of heat and another of cold; our ideas are materially false, Descartes says, if we take the ideas of heat and cold and “do not recognize that there is more of reality which would be represented by the one than by the other.” Thus, ideas as such are in themselves true or false, without reference to that of which they are ideas—namely, when we do not recognize in an idea its own proper degree of objective reality. On the other hand, when we consider ideas formally, we consider them as representing something outside, and we then make judgments using these ideas. All error in judgment is, for Descartes, formal error!⁸ To see this clearly, we only have to look at *Meditatio III*, where Descartes says (IX, 29), that there are three forms (*formes*) of thought: I. ideas proper, which are “as the images of things” (*comme les images des choses*); II. volitions and affections, e.g., desire, fear, affirmation and denial; and, III. judgment, as when we consider something as the subject of the action of the mind, “thereby adding something to the idea I have of it.”

It cannot be stressed too often both that judgment adds something to our idea of something, and that *formal* falsity concerns the association of ideas with their objects. On the other hand, volition—free will, choice—is by no means merely a matter of action in this world, according to Descartes. Indeed, one of the lessons taught us by the *Meditationes* is that the principal power of volition is to permit us to *withhold* judgment—that is, not to add anything to a present idea with respect to that of which it is an idea. However much a teacher of revolutionaries Descartes may be said to be, he is indeed a philosopher.

In judging, one takes the idea of cold, formally, as representing something; materially, one takes the idea of cold and compares it with the idea of heat in order to determine which idea has more objective reality. If one is materially false and concludes that the idea of cold has as much objective reality as does the idea of heat, then it is likely that he will also commit a formal error in judgment and assent to the proposition that cold is really contained in the ice. This power of asserting/assenting is never misused if and only if we never judge (treat ideas formally) until we are absolutely sure that the degree of objective reality of the idea is exactly that of the degree of *entitas*, reality, of the thing on which we pass judgment. (It is, of

course, an apparently necessary consequence of this that the inferior, i.e., more ignorant, man, can never pass a true or accurate judgment on a superior or more knowledgeable man. Here we find a very well hidden, technical intimation of what D'Alembert might have meant when he called Descartes a "teacher of revolutionaries"—i.e., that traditional societies with their traditionally chosen legislators and judges must be replaced by analytic physicists or their students. D'Alembert, as we shall see, perhaps does not fully appreciate the place of will, volition, in Descartes' political thought.)

In short, we commit error, according to Descartes, when we take an idea and consider it as being caused by something outside us (or, sometimes, even by a particular patron idea inside us) without inquiry as to its respective grade of reality. It is this source of error to which he addresses his method primarily. All entities and all ideas of those entities are so ranked and graded that true science, *Mathesis Universalis*, consists in leading thought by definite, but above all, by *continuous*, degrees—up ranks, grades or steps, *gradatim*—which exactly parallel the structure of hierarchical being within which we humans are placed as thinking beings. It is not too bold to speculate that perhaps out of this view our contemporary fascination with historical processes and stages takes its genesis and that, furthermore, this fascination will endure as long as the generally taught and received physics is analytic: The historical analytic physics of the Enlightenment is the spring which feeds analytic History.

Descartes' doctrine concerning will is essentially concerned with our rank in the hierarchy of beings. He tells us, in *Meditatio IV*, "Concerning the True and the False," (IX, 45-46), that we are distinctly limited in our substantial being but that we have a will which is in no way at all limited. Although at any given time any given understanding is strictly limited as to what in the structured universe it knows, the possessor of that understanding still has the intellectual power to assert opinions concerning anything, even though it be above the 'level' of his understanding—where, it must be remembered, both will and understanding are intellectual facilities. Therefore, one's *mental* faculty of willing can operate even in cases where his ideas do not have the degree of objective reality required for a clear and distinct grasp of something at hand, that is, before those ideas have a level or degree of objective reality commensurate with that degree possessed by what he is judging. This excess of the

extent of the will over the grasp of the mind is the precondition for the possibility of universal doubt. This alone gives us the power to stand in a certain sort (i.e., analytic) of *anticipatory* relationship to all things whatsoever, no matter on what level our thoughts may be with respect to their degree of objective reality. Thus, although in fact the mind of any given mortal who will die in a finite length of time may not be capable of grasping some particular truth—because, that is, he will never have the time to build up to it in a finite time from his birth—still, his will is actually (“*en effet*”) capable of choosing to make some judgment concerning that truth, even when it is highest and most beyond the degree or rank of the intellectual reality of his ideas. As a consequence, those things above his present level of understanding are nevertheless in a certain and definite relationship to it—one which has here been termed a relationship of “volitional anticipation”; for, those things cannot be merely unknown, since they are objects of an *intellectual* power of willing. Descartes calls this tenuous relationship one of *indeterminacy* on the part of knowledge and says that corresponding to it is the volitional relationship of *indifference* (IX, 46-48). We are the creatures that we are and therefore we have the power to pass judgments even on what is infinitely more real than the reality of our ideas concerning it. An instance might well be that of the atheist who judges, from the extreme depth of his ignorance, that his idea of God has as its ultimate patron the fiction of some conniver. He is free to pass such a judgment. But, Descartes points out, this freedom which the immensely ignorant atheist has to judge that his notion of God is ultimately merely a fiction of a deceiver is the lowest kind of freedom and is so unreal, relative to that degree of objective reality which the atheist’s idea of God could have—e.g., if he were to read and comprehend Descartes’ own *Meditationes*—that it has no effect on his ignorant idea. Hence, the atheist has so little grounds for judging, that either negative or affirmative judgments are equally called for, and he is thus indifferent as to his choice. In this case, and in all such cases, error is based on negation of being (IX, 47-48).

What is a matter of indifference with respect to the will is a matter of indeterminateness with respect to the understanding; for, the bare notion of the higher reality is present, even if that reality does not happen to determine fully the objective reality of the idea. Thus, although the atheist is not fully aware of it, i.e., although he does not

realize it in thought, the idea of God which he truly has is the unique, true patron-idea from which his thinking of God must borrow its degrees of objective reality. Hence, in whatever pit of ignorance one might be, the ultimate patron ideas are present—a fundamental theme in Descartes and the necessary precondition for his analytical mathematics as he himself understood it—and, as a consequence, whatever stands between one's present ignorance and the full intellectual realization of those patron ideas as patron is, as it were, known indeterminately in the bare consciousness of the subject-matter.

Likewise, to return to mathematics, the *quaesitum* or sought-for solution to a problem, is, in some very determinate and definite sense of the term, "anticipated," or, even, "indeterminately given through anticipation." Things whose reality are of a higher degree than the present grade of objective reality of our present ideas about them are, so to speak, foreshadowed or adumbrated as "to-be-known" in the very excess of the extension of the will to know over our actual understanding, and, therefore, the principal source of error, according to Descartes, is also the very grounds for anticipating a replacement of error with knowledge. (This is the heart of *Meditatio VI.*) Once again, *volition is a power of mind*, for Descartes—no less than is ratiocination itself. Choice is an *intellectual* act, *essentially*, and that very infinitude of the extent of the will is a sign of the extent to which man can expect other powers of intellect to extend. In calling volition or choice—where choice is *not* desire for Descartes—an *intellectual* power, Descartes thereby identifies anything which can be chosen at any time (in or out of understanding), under any circumstance (drunk, sober, ill), as a definitely potential object of understanding. Therefore, as an actual object of volition, everything in the universe is a sort of actual subject of intellect. We are thus permitted to say that, for Descartes, the very fact of willing anything whatever implies that there is some degree of something akin to objective reality present—even in the most wild or disordered of ideas. And it is volition which supplies a sort of *pro tem* replacement for objective reality to ideas of things which are not as yet grasped clearly and distinctly. Indeed, we see Descartes say (IX, 46) that once he has grasped entirely clearly and distinctly some idea, he is not *at all* indifferent to it—and hence it is no longer subject to volition, but rather to desire and repugnance which are

contingent on true understanding (or else, upon the teaching of our complex nature).

We can sum this up in the following analogy: As volition is to desire and repugnance, so is merely being aware of existence to the grasping or conceiving of an idea whose objective reality is of the same rank of being as the thing itself has of degrees of entity or reality. A psychic—and thus *mental*—power, volition, supplies (“eminently”) to our deficient ideas of what is truly existent but not sufficiently known the defect in objective reality of our ideas which can only be made up, *en effet*, through the analytical procedure—i.e., through assuming the sought-for, *quaesitum*, as given and known, and then deducing (*gradatim*) from this supposition the consequences until we arrive at something truly given or truly known—*vide La Géométrie*, VI, 372, 10-24.

We close this development with a reflection on the relation of will and popular wisdom.

The citizen who is a non-scientist must ignorantly adhere to the laws and customs of his country by an act of free will. For, no non-scientist could possibly have the perfect understanding required to fix his choices to the absolutely best choice possible. Under Descartes’ analysis of volition, knowledge, and indifference, any adherence to a civil order out of which lawfulness itself could grow would be based either on an act of positive choice—and this, at first sight, could only apply to the citizen-scientist who clearly understands his own good—or an act of will fixed through some negative means such as ‘scientific’ propaganda which works through such devices as constructing attacks on the pre-scientific culture, by positively promising ‘better things for better living through chemistry’ and the like, or, by redefining all political problems as precisely those human problems which can be solved by technological progress. If, to continue with this latter case, such devices in fact were to succeed in fixing the will of the non-scientist citizen, then his willing adherence to the legislation of the scientist-ministers would seem to comprise a sort of volitional substitute for scientifically based adherence to those very laws. In this case, however, the “eminent reality” of the volitions of the relatively ignorant populace would be only that borrowed, in turn, from the “objective artifice” of the minds of the scientist-ministers. Whereas, to the contrary, what is sought is a civil order in which the eminent reality of the

volitions of the relatively ignorant populace lend to their relatively obscure grasp of public matters a reality which—although not the objective reality of the clear and distinct ideas of the scientists—would make up for that defect because the exalted degree of reality of the substance, *res cogitans*, wills the good of the union of mind and body within the safety and comfort of civil society; this eminence of degree would suffice to make up that defect of objective reality in their relatively low level of understanding. The eminent reality of the free will of the populace should manifest itself in its power to give to the state in which they live a degree of objective perfection *just* commensurate with the degree of objective reality of the ideas each citizen has of his or her own healthy union of body and soul. For, then, and only then, would the art of politics become *materially* identical with the art of medicine—Descartes' *dessin*.

But, if volitional indifference answers to intellectual indeterminateness, how could volition be freely *exercised* by a relatively ignorant populace? Would not their ignorance necessarily render them indifferent, and hence incapable of exercising their free wills?

In *Meditatio IV*, Descartes tells us that the infinite plenitude of volition answers to the actually infinite plenitude of being of the universe as perfectly known by God Himself. He says that it is precisely in our possession of an infinitely extensive will that we are most God-like (VII, 56, ²⁶ - 57, ¹⁵). Since volition is an intellectual power, the "eminent reality" supplied by the mind to our particular intellectual acts of will must therefore contain our only basis for judgment and hence for particular choices subsequent on particular desires. This requires, however, that the "eminent reality" borrowed from the substance, *res cogitans*, by volition anticipates a distinct degree of reality—precisely that degree possessed by the object being considered as choiceworthy or not. In precisely the same way, the structure of the general equations of physics expresses indeterminate the grade or level of reality of whatever it is to which they can apply in their full generality—where that generality is a sort of anticipation of all individual cases which can fall under the general one. Free will, like *Mathesis Universalis*, (algebra), is only called for or needed where there is something definitely unknown, i.e., known definitely in the indeterminate manner and hence by anticipation. But, again like *Mathesis Universalis*, the degree of objective reality which must be present in any given instance of thought (including

volition), in order to be precisely commensurate with the degree of entity with which it is concerned, must be present to it formally:⁹ In mathematics, the very order of its symbolic expression makes explicit the interdependency of the partial expressions it contains for the givens and the unknowns; by analogy, the will of the relatively ignorant populace can be freely expressed only in that state whose freely chosen form of government is one which is entirely open to the constant inspection and re-affirmation of that populace. The relatively ignorant populace can freely exercise its will in that form of government which is defined by its structures, where politics is a profession, but above all else, where the goal of civil union is explicitly understood by each and every citizen and minister as being the continuation of the union of body and soul, of life, of each citizen/elector.

1. *Vide: Fenn's Algebra* (Dublin, c. 1750): "... in general, the Solution of Problems consists of two Parts, in the first the Analyst expresses by a letter as x or y etc., the unknown Quantity sought, or one of those which when known, serves to determine the rest. . . .

"The first of those two Parts is not easily reduced to precepts intelligible to Beginners, and perhaps can be learned only by Example." (p. 5). This author, who taught algebra for five years, heartily concurs with Mr. Fenn.

2. It seems not unlikely to this author that Descartes, as well as Vieta, was possibly influenced (directly or indirectly) by a text of pre-Galilean music theory, the *Sectio Canonis*, *Vide: I. Heilberg and H. Menge, eds., Euclidis Opera Omnia*, Vol. VIII, "Phaenomena et Scripta Musica" (Leipzig: Teubner, 1916), esp. pp. 169-73, Props. VIII-XII; also, *Vide: Descartes' own Compendium Musicae* (X 89-141), whose treatment appears to be that of Euclid and certainly not that of Galileo.

3. The term *engineer* is only a variant spelling of the Latin term *ingeniose* plus the ending required to make that adjective into a noun referring to one who has *ingenium*.

4. It very likely did not escape Descartes' notice (nor should it ours) that *machine* in Greek (*Mēkanikē*) is translated by *ingenium* in Latin.

5. This is Bertrand Russell's definition of a natural number. The definitions of Peano's Postulates follow the same rationale. Descartes' influence is very great.

6. *Vide: Definition IV of Descartes' proof of the existence of God in Res. Sec. Obj.*, especially in the French version which has important changes from the Latin version (French, IX, 125; Latin, VII, 161, 10-13): "The same things are said to be eminently in the objects of ideas when they are not truly such in them as in the ideas, but when they are so great (*si grandes*) that they can make up for that defect by their excellence."

Gilson (E. Gilson, *Etudes sur le Rôle de la Pensée Médiévale dans la*

Formation du Système Cartésien (Paris: Libraire J. Vrin, 1967) hardly touches upon this question of the eminent reality of ideas in Descartes' thoughts. When he does, however, it is in the context of discussing causality (*passim*). The heart of the problem with this term, as well as with the term "objective reality of an idea," lies with intelligibility and, in so far as causality enters the picture, it is as the cause of knowledge. For Descartes, to be sure, to think is to make. But any making is for him posterior to a thinking.

7. *Vide*: Vieta's "Introduction to the Analytical Art" (in: J. Klein, *Greek Mathematical Thought and the Origin of Algebra*, Cambridge, M.I.T. Press, 1968—given in an appendix trans. by J. Winfree Smith).

8. This is truly odd, since "judgment," however else it is used, constantly refers primarily to our sense of what is more important than something else. But such a meaning—the usual one—does not fall in Descartes where we might expect. Rather, that meaning falls under what Descartes calls the question of material falsity and not under that of formal truth and falsity which (according to him) concerns judgment.

Our contemporary low estimation of 'value judgments' is not unlikely to have its origin in this Cartesian reversal, which replaces the question of value (for Descartes a material question) with that of the objectiveness of a state of mind (for Descartes, a formal, "judgmental," question). If so, this reversal of definitions is not without its momentous—not to say awful—consequences.

9. That is to say, since for Descartes *les pensées* (including perceptions, volitions, etc.) have a distinct mode of being as *pensées*, any given one has an objective reality which is present to it materially. If any *pensée*, however, is then considered as a *pensée* of something which is not a *pensée* (such as a tree outside), we consider it, formally, as being commensurate, or not, with that of which it is the (presumptive) *pensée*. Hence the formulae of mathematics can be viewed (a) as mathematically correct deductions from other formulae, and thus, "materially"; (b) as means to a solution of a problem in physics, and thus "formally." Any investigation of volition in a context including choiceworthy and repugnant objects would be a formal undertaking and, in Descartes's case, is identical with *La Morale*—Ethics, or perhaps more accurately, Social Science.