Descartes’s Tests for (Animal) Mind

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I. PREFATORY REMARKS

Perhaps no question cuts to the heart of philosophy more quickly than whether animals have minds. Certainly, no question is more central to philosophical ethology. Treatments of animals seldom appear as the focus of historical attention, yet nearly every major philosopher has advanced an account—often quite detailed and sometimes sophisticated—of the nature of animals and of their kinship (or lack thereof) with humans. The attention justly given to Descartes’s views about animals, and in particular to his two touchstones or tests for animal mind, constitutes a happy exception to this pattern of neglect. We say justly given because—with the exception of Aristotle—no thinker before Darwin has contributed more to philosophical ethology than has Descartes.

In his influential study of Descartes’s Two Tests for mind, Keith Gunderson called attention to the fecundity and enduring legacy of Descartes’s philosophical ethology. Gunderson noted that
it is somewhat ironic that the main outline and outlook of much of the Cartesian Mechanism is almost identical with the main outline and outlook of philosophical positions which in this century are regarded as essentially anti-Cartesian. It is no exaggeration to say that many Mechanistic features of Descartes's philosophy of mind have much in common with various physicalistic and behaviouristic views which have been supported by the logical positivists, with certain philosophical claims which have issued from cybernetics, and even with the type of mind/body identity thesis currently supported by Professors Feigl, Smart, and others.¹

Gunderson further remarked that “the bête machine controversy—the discussion of the animal soul . . . may be viewed as a seventeenth- and eighteenth-century counterpart of virtually the whole cluster of recent discussions which have taken place on the topic which may be roughly called Mentality and Machines,”² which includes such topics as “other minds, behaviourism, free will, and the mind/body relationship.”³ Gunderson went on to claim that “almost every major position which has been taken with respect to the current discussions has a counterpart in the 17th and 18th centuries, with the exception of those connected with certain studies in computer simulation of cognitive processes and artificial intelligence and anti-mechanistic arguments based on metamathematical theorems such as Gödel’s Incompleteness Proof.”⁴

Although Descartes had little to say about language itself, his legacy extends to contemporary linguistics. For example, Noam Chomsky finds in Descartes’s writings relating to his Two Tests for (animal) mind, and especially to the first test (the so-called Language Test), a remarkably clear-headed recognition of the creative aspect of everyday language use:

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 intelligence 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.)⁵

We not only endorse Gunderson’s and Chomsky’s assessments of Descartes’s legacy but wish to enlarge them. Recent work in ethology, in comparative psychology, and in animal communication has brought the question of animal mentality and animal language to front and center stage, both scientifically and philosophically. Even the latest exciting scientific development—Daniel Povinelli and Steve Giambrone’s ingenious attempt
to trump the argument from analogy for animal minds—sounds echoes of Descartes. 6 It is no exaggeration at all to say that Descartes has set the stage for all modern and contemporary work, both scientific and philosophical, on animal minds. In particular, Descartes has supplied the categories that structure this work. In his influential book Animal Minds, the cognitive ethologist Donald Griffin critically surveys the range of such work, concluding that “three categories of evidence stand out as the most promising sources of significant, though incomplete, evidence of conscious thinking by non-human animals,” namely:

I. Versatile adaptability of behaviour to novel challenges . . .
II. Physiological signals from the brain that may be correlated with conscious thinking . . .;
III. Most promising of all, data concerning communicative behaviour by which animals sometimes appear to convey to others at least some of their thoughts.”

Griffin’s categories I and III relate directly to Descartes’s Action Test and Language Test, respectively. Category II, the least compelling of these three types of evidence, relates to analogical arguments for animal minds, arguments famously rejected by Descartes. But as we will see below, Descartes’s dismissal of these arguments from analogy is neither so peculiar nor so unsound as it has seemed to many to be.

Just as Nature was once thought to do, exegesis abhors a vacuum. But unlike physical vacuums, exegetical vacuums come in two varieties. The first type—dearth of commentary—is readily recognized and appreciated. The second type is more insidious and pernicious. It consists in the absence of explicit criteria of interpretative adequacy, i.e., the want of criteria that an interpretation or account must satisfy to be acceptable or successful. To do history of philosophy responsibly, one must antecedently set forth adequacy criteria that govern exegetical success in the given episode. Then one must show that one’s own account satisfies these criteria, whereas rival accounts do not. Absent such criteria, exegesis or interpretation remains a hit-or-miss enterprise whose practitioners do not—and cannot—themselves know whether they have succeeded, and if so, to what degree.

Parting company with most Descartes commentators, we will scrupulously follow the foregoing prescription for responsible history of philosophy. 8 To this end, we will set forth eight criteria of interpretative adequacy that bear upon Descartes’s Two Tests for (animal) mind. We will show that our account of these tests satisfies all eight criteria, thereby qualifying as acceptable or successful, whereas rival accounts do not. By thus calling attention to methodological shortcomings in the history of philosophy, we hope to promote methodological sophistication, perhaps stimulating some historians to follow our example by routinely setting forth criteria of adequacy for their exegeses.
In our examination of Descartes’s Two Tests, we shall occasionally be critical of the work of other commentators, sometimes sharply so. For example, we will argue that Daisie and Michael Radner’s interpretation of the Two Tests is an exegetical castle built on the sands of defective translation. But even our harshest criticism should not be taken as blanket condemnation or wholesale rejection of their work. There is much of value to be found even in the commentaries we criticize most severely. The Radners, for instance, merit high praise for calling attention to the fruitfulness of what they dub “the zoocentric approach” to philosophy, and for their forceful declaration that placing animals at the center of philosophical discussion casts new light on important philosophical issues.

Textual interpretations cannot be communicated in an informational void, so we assume a modicum of familiarity with Descartes’s principal writings or, what is equally satisfactory for our purposes, with recent commentaries on them. We would have liked to cite Descartes’s texts in their original languages, but a sober assessment of contemporary knowledge of seventeenth-century Latin and French impelled us to use English translations. We have supplied our own translations whenever we felt that standard translations, such as the usually reliable translations of Cottingham, Stoothoff, and Murdoch, were either inadequate or unsuited to our purposes.

II. DESCARTES’S TWO TESTS FOR MIND: FIRST VERSIONS

The objects of our investigation are the pair of touchstones christened the Language Test and the Action Test by Keith Gunderson, which were first formulated by Descartes in Part Five of the Discourse on the Method (1637). It is important to bear their original purposes in mind. These touchstones were never intended to enable a human being to recognize that he or she has a mind. For Descartes, such first-person recognition is a matter of continual and indubitable inner-awareness or introspection. Rather, these touchstones were meant, in the first instance, to distinguish genuine human beings from God-made humanlike machines that are as similar in construction and behavior to real humans as it is possible for them to be, i.e., to distinguish genuine human beings from natural, humanlike automata. In the second instance, these devices were meant to reveal the fundamental difference(s) between humans and (brute) animals.

So that we might have them conveniently at hand, here are Descartes’s earliest formulations of his Two Tests:

Intuitive uncritical formulation of the Language Test: The first [of these two very certain means of recognizing that God-made humanlike machines are not true humans] is that they could
never use words or other signs, composing them as we do in order to declare our thoughts to others.\textsuperscript{14}

\textit{First version of the Action Test}: And the second [very certain means of recognizing that God-made humanlike machines are not true humans] is this. Although such machines might do a number of things as well as or perhaps better than any of us, they would inevitably flounder ineffectually in some others. By these ineffectual floundering one would discover that they do not act through understanding but solely through the disposition of their organs. For whereas reason is a universal instrument which is of service in all situations, these organs require a particular disposition for each particular action. From this it follows that it is morally impossible that there be enough diversity of organs and dispositions in a machine to make it act in all life situations in the same way that our reason causes us to act.\textsuperscript{15}

We characterize the above formulation of the Language Test as \textit{intuitive} because it conveys its author’s idea compactly and non-technically, to wit: \textit{machines are unable to use language to convey thoughts to others, whereas humans can.} And we call the formulation \textit{uncritical} because of its manifest vagueness and unclarity. That Descartes himself regarded it as uncritical may be inferred from the fact that, no sooner had he stated it, he saw fit to recast it into a more precise form.\textsuperscript{16} In this respect, Descartes’s gambit brings immediately to mind W. V. O. Quine who, immediately upon framing his \textit{Indeterminacy-of-Translation} thesis, deprecated his initial formulation as \textit{intuitive} and \textit{uncritical}. Like Descartes, Quine at once supplanted his uncritical formulation with two critical versions that were supposedly more clear and precise.\textsuperscript{17} We note that this arresting \textit{modus procedendi} is by no means limited to Descartes and Quine. One encounters it everywhere in philosophy—at least everywhere where clarity and precision are prized.

Philosophers and historians approach philosophical theses with different objectives, so the rules of responsible exegesis applicable to them sometimes differ. Philosophers are concerned ultimately with truth or falsity, and so they seek to substantiate theses or to discredit them. But philosophical theses rarely come so clearly and precisely formulated as to admit of decisive adjudication. They must first be clarified and made precise, and the process by which this is done is an exegetical enterprise. Furthermore, the exegetical tactics of philosophers are a function of their strategic objectives.\textsuperscript{18} If they seek to substantiate a thesis, logic requires them to take the logically stronger path at every interpretative or exegetical fork; if they seek to discredit it, logic requires taking the logically weaker one. Only then may philosophers claim success if they succeed in substantiating, or in discrediting, the refined and furbished thesis. To proceed otherwise is simply \textit{bad philosophy.}\textsuperscript{19}

In their passionate inquiry into animal consciousness, the Radners interpret Descartes’s tests for mind in such a way that higher animals pass them
with flying colors. To the inevitable question of why did Descartes then not believe that at least some animals could pass his tests, the Radners offer the following answer:

In order to keep animals from passing the test, he [Descartes] has to interpret “thought” in the narrow sense of pure thought or reason. To conclude that animals lack thought in the wider sense, he needs the additional premise that all modes of thinking, including sensations and feelings, presuppose pure thought as a necessary condition. This premise we found to be unwarranted by Cartesian principles.20

The Radners’ objective is to defeat Descartes on his own ground, i.e., to show that from within his own system Descartes’s verdict that animals lack minds is unwarranted. By the canons of sound philosophical exegesis, then, the Radners should take the logically weaker paths at the various interpretative forks they encounter. But in fact they select the logically stronger paths at some exegetical forks, e.g., they take the concept of thought ingredient in the Language Test to be pure thought. (Pure thought is the sort of thinking characteristic of metaphysics and mathematics.) The unhappy consequence is that the Radners succeed in refuting a Straw Man, not Descartes. In this one respect, then, their treatment of Descartes’s Two Tests illustrates what a paragraph ago we called bad philosophy.

Historians of philosophy have many concerns, but the truth or falsity of philosophical theses is not among them. Qua historians, they do not concern themselves with whether Descartes’s tests for mind really work, i.e., with whether the tests succeed in discriminating minded from mindless organisms. Their highest historical duty is service, namely, to investigate the ruminations of a thinker or school, or the content and/or context of an idea or thesis, and to communicate the findings in a way that facilitates the tasks of philosophy. It would be unreasonable to expect historians qua historians to show that suitably honed versions of Descartes’s tests succeed (or fail) in distinguishing humans from automata and animals. But it would be altogether fitting and proper to expect historians to report on these tests in a way that materially helps philosophers to show whether they succeed or fail, and to explain why. The eight criteria of exegetical adequacy set forth below go far, we believe, toward ensuring that any account of Descartes’s tests that satisfy them will be suited to play this service role.

The roles of philosopher and historian sometimes merge. One region of overlap concerns authorial authority. Do philosophers have absolute or only limited authority over their own creations? For example, among the many claims that Quine makes about the Indeterminacy of Translation are the following: translation is sometimes empirical (i.e., for a restricted class of sentences, whether one sentence is a legitimate translation of another is a factual matter); and infinite divergence in translational output makes a pair

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of translation manuals rivals. Must we therefore understand translation in such a way that, in any language, the translation of some sentences is empirical, or might it turn out that translation is never empirical? And must we take infinite divergence to be part of the concept of rival manuals, or may we classify Quine’s musings about such divergence as asides—mere obiter dicta—which might be true but which also might be false? We believe that a compelling case for giving Quine only limited authorial authority over his Indeterminacy-of-Translation thesis has recently been made. In particular, we think that both of the aforesaid claims should be construed as obiter dicta, rather than as part of the content of the Indeterminacy-of-Translation thesis—no matter what Quine himself might have said or might later have to say about it. Recognizing the generality of the reasoning underlying the case for these claims, we conclude that no philosopher has absolute authorial authority over his or her creations. In this respect philosophy resembles mathematics rather than literary fiction. In the latter the principle ipse dixit rules. For example, Sherlock Holmes was and did whatever Conan Doyle made him out to be or to do. But mathematical and philosophical creations have lives of their own, independent of their creators. For example, a set is not whatever Georg Cantor made it out to be. Neither is the Indeterminacy-of-Translation nor are the Two Tests for mind whatever Quine or Descartes might have made them out to be.

Classifying remarks correctly as intrinsic to some thesis or as extrinsic obiter dicta is an exacting part of the exegetical enterprise of turning an intuitive or uncritical formulation of a thesis or claim into a well-honed, critical one. This demanding exegetical task falls squarely upon the shoulders of both philosophers and historians. For example, in his correspondence as well as in his published and unpublished writings, Descartes has much to say about, or significantly relevant to, his Two Tests. Whether to construe any of these remarks as reiterating or recasting what is intrinsic to the Two Tests—i.e., what constitutes or belongs to their conceptual content, as opposed to construing them as obiter dicta—is a delicate and difficult matter that sorely challenges the professional skills of the philosophers and historians who inquire into the matter. Here again, well-thought-out criteria of interpretative adequacy can offer valuable guidance to those who undertake this arduous task.

III. FIRST CRITERION OF EXEGETICAL ADEQUACY: WHY DID DESCARTES THINK THAT HIS TWO TESTS WERE TESTS FOR MIND?

The simple fact that Descartes intended his Two Tests to be touchstones for mind leads immediately to our first criterion of exegetical adequacy:
To be adequate, an interpretation of the Two Tests must explain why Descartes took them to be diagnostic of mind.

On first encountering this criterion of exegetical adequacy, readers might be disposed to dismiss it as too obvious to merit mention. But the fact that these readers would search in vain for a commentator who forthrightly addresses it is sufficient reason not only to state it but also to accord it pride of place. Like the other adequacy criteria set forth below, satisfaction of this first interpretative criterion should be taken to be a *sine qua non* of any adequate account of Descartes’s Two Tests for mind.

Our own explanation of why Descartes took the Two Tests to be diagnostic of mind is rooted in his metaphysical dualism. In a 1649 letter to Henry More, Descartes recalls the line of thinking that had led him more than a dozen years earlier to his Two Tests. Prominent in this autobiographical reflection is Descartes’s conviction that there are exactly two sources or principles of bodily motions, one mechanical and the other mental:

> But after I had noticed that two different principles of our [bodily] motions must be distinguished: namely, one clearly mechanical and corporeal, which depends solely on the force of the [animal] spirits and the conformation of our [bodily] members . . ., the other incorporeal, namely, the mind or that soul which I have defined as a thinking substance. I then investigated very diligently whether the motions of animals arose from these two principles or from just one of them only. And when I discerned clearly that all of their motions could arise solely from that principle which is corporeal and mechanical, I took it as certain and demonstrated that in no way could we prove that there is a thinking soul in brutes.23

The challenge that faced Descartes, therefore, was to fabricate a test or tests that would discriminate between *mentally produced* motions and *mechanically caused* ones. For brevity’s sake, let us understand by a non-mechanical motion a motion in which mind has played a causal role, however small. From Descartes’s dualistic perspective, then, the general nature of the desired tests is obvious. One needs a device that detects non-mechanical motions, for a putative test will pass muster as a touchstone for mind if and only if it can detect non-mechanical motions. Equipped with such a device, a Cartesian investigator could justifiably conclude that a humanlike agent A has a mind if the device detects one or more non-mechanical motions on the part of A. But if repeated application of the device fails to detect non-mechanical motions on the part of A—especially in circumstances where such motions are most likely to arise—the investigator would be entitled to conclude that A most probably does not possess a mind. The challenge for Descartes, therefore, becomes how to detect non-mechanical motions of humanlike agents and animals, i.e., how to detect non-mechanical
motions of embodied agents. This problem in turn reduces to two subpro-
blems, depending on whether the agent is humanlike or animal. 24

Descartes’s speculative neurophysiology further reduced the problem
of detecting non-mechanical motions of humanlike agents to that of detect-
ing non-mechanical motions of the pineal gland (also known as the pineal
body or conarium), the small cerebral organ made unmeritedly famous by
Descartes. 25 Bernard Williams notes that in the Passions of the Soul
Descartes gives a “thoroughgoing causal account” of the relations between
the human soul or mind and the human body, an account according to which
the soul or mind exercises its dominion through the pineal gland which sits
near the top of the brain. 26 Williams alleges that “Descartes particularly
selected this organ because it appeared unique in the brain in being single
and also because he falsely believed that it did not occur in other animals,
for which the question of the relations of soul and body did not arise.” 27 The
precise nature of the causal tie between mind and body effected through the
mediation of the pineal gland is deftly sketched by Williams thus:

The picture Descartes offers is that of the soul directly moving
the pineal gland and thus affecting the “animal spirits” which he
considered the hydraulic transmission system of mechanical
changes in the body; consonant with his views on the conserva-
tion of motion, it is only the direction, and not the speed, of
movement of these spirits that is affected by the soul. This is the
direction of action of the will. In the opposite direction, changes
in the body—such as the effect of external objects on the sense
organs—are transmitted to the pineal gland by the spirits and
can there affect the soul by causing sensations in it. 28

So, to ascertain whether a humanlike agent A is an authentic human being,
i.e., whether A possesses a mind, all the Cartesian investigator needs is a
device that detects non-mechanical motions of the pineal gland. An investiga-
tor armed with such a device could justifiably conclude that A has a mind
if the device detects one or more non-mechanical motions of A’s pineal
gland. But if repeated applications of the device fails to detect any non-
mechanical motions of A’s pineal gland—especially in a broad range of cir-
cumstances where such motions are most likely to occur—the investigator
may warrantedly conclude that in all probability A does not possess a mind,
i.e., that A most probably is not a bona fide human being but merely a
humanlike automaton. 29

What we have said so far is only approximately true. What makes it fall
short of perfect fidelity is the fact that within Descartes’s system it is con-
ceivable that the motions or actions of a humanlike agent A should all be
mechanical, and yet that A would nonetheless possess a mind or soul. In
other words, Descartes is able to conceive of a genuine human being all of
whose external actions are mechanically caused—in the sense that every
one of its many external actions can be mechanically explained and accounted for. Descartes concedes “that there are scarcely any men who are so weak and irresolute that they will nothing other than what their passion dictates. Most [men] have settled judgments, by which they regulate a part of their actions.”30 In these rare cases, the “weak and irresolute” human agent A would simply have consented to all the motions that the mechanical influences on A’s pineal gland caused A’s body to make. That is to say, not only was every external action of A mechanically determined, but for every mechanically determined external action x of A, either A willed x, or A refrained from willing any action incompatible with x, i.e., from willing any action that incorporates motions other than ones A’s body was mechanically determined or fated to make.

For Descartes, many and perhaps even most of the things we do voluntarily are of the mechanically determined sort. That is, we often—and perhaps nearly always—go along with our bodies in the sense that we consent to mechanically determined motions of our body (internal organs and other body parts included) either directly by willing actions that entail them or indirectly by refraining from willing something incompatible with them. Indeed, for Descartes the natural and salubrious function of the passions is to get us to go along with our bodies in the way just explained:

The function of all the passions consists solely in this, that they dispose our soul to want the things which nature deems useful for us, and to persist in this volition; and the same agitation of the [animal] spirits which normally causes the passions also disposes the body to make movements which help us to attain these things.31

And having just said of five (love, hatred, desire, joy, and sadness) of the six primitive passions that “their natural function is to move the soul to consent and contribute to actions which may serve to preserve the body or render it in some way more perfect,”32 Descartes goes on to make the following more general claim about this role of the passions: “This function of the passions is the most natural that they can have. For all the animals devoid of reason conduct their lives simply through bodily movements similar to those which, in our case, usually follow upon the passions which move our soul to consent to such movements.”33

Thanks to the continual and immediate awareness of his own mind, the human agent who always goes along with the mechanical dictates of his body nevertheless knows indubitably—from the inside, as it were—that he has a mind and so is not a humanlike machine or automaton. But to us outsiders who have no direct awareness of his mind, such a human agent is indistinguishable from a humanlike automaton. Therefore, were we ever to encounter a humanlike agent all of whose actions were known by us to be
mechanically determined, i.e., a humanlike agent who never exhibited a non-mechanical motion, we would confidently conclude that it was an automaton because the probability that it was a human agent who just happened always to go along with its body would be negligibly small. Still, in the strict Cartesian sense of “proof” or “demonstration,” we could never prove or demonstrate that this agent did not possess a mind. And what is thus true of humanlike agents is also true of animals. Even the most convincing proof that all their actions are mechanically determined would fail to rule out the remote possibility that animals really do have minds but *mirabile dictu* happen always to go along with their bodies. As Descartes himself remarks in a letter to Henry More: “But although I take it as demonstrated that one cannot prove that there is any cogitation in brutes, I do not think on this account that one can prove that there is none at all, since the human mind does not reach into their hearts.” Only if we were able to reach into their hearts, i.e., only if we had the power to be directly aware of their thoughts (if they have any thoughts) in the immediate way that we are aware of our own thoughts, could we rule out the extremely remote—and for all practical purposes negligible—possibility that animals possess minds but just happen always to choose to go along with their bodies. In Descartes’s idiom, it is *morally certain—but not proved or demonstrated*—that animals have no minds.

Hereafter we will ignore the extravagant or hyperbolic possibility of human beings who choose always to go along with their bodies, so let’s return to the challenge facing Descartes. We saw that his basic problem is how to detect non-mechanical motions of the pineal gland in humanlike agents. Conceivably, such detection could be either direct or indirect. But there obviously was no direct way for Descartes to detect a non-mechanical motion of even his own pineal gland, much less of someone else’s. Such direct detection would not only require imaging equipment of a sort undreamt of in Descartes’s time, but it would require also that the investigator not only know the quantitative values of the velocity, shape, size, and position of the pineal gland and of every body acting mechanically on it at the relevant time, but also that he know and be able to apply all the relevant laws of mechanics to these several bodies. For only if one could calculate what the motion of the gland would have been—on the assumption that only mechanical forces had acted on it—would one be able to tell whether the gland had in fact moved in a non-mechanical way. The immense number and minuteness of the animal spirits alone suffice to show the practical impossibility of getting the needed data. Therefore, direct detection of non-mechanical motions of another’s pineal gland—the motions symptomatic of genuine mental activity—was a practical impossibility, albeit a theoretician’s dream.
So the only alternative left to Descartes was to find indirect ways of detecting non-mechanical motions of another’s pineal gland. But this desideratum presented a formidable challenge for the following reasons. Descartes believed that, for any natural movement of which the human body is capable, there is a unique corresponding natural movement of the pineal gland, namely, the glandular movement that causes the body to move in the given way. Additionally, he believed that there is no natural action-producing motion of the pineal gland that the human will could not bring about as a result of being directed at some appropriate action. For example, there is a motion of my pineal gland that causes my body to move the way it does when I kick a ball. To effect this particular motion of my pineal gland, I need only will to kick the ball. That is, for every natural action-movement of my body, there is a corresponding natural pineal-gland movement that produces it; and for every such pineal-gland action-producing motion, there are one or more acts of will that can bring it about. But what makes this problem a hugely difficult challenge for Descartes is his scientific conviction that every natural pineal-gland movement can be brought about mechanically. How are we to tell, then, whether a body movement springs at least in part from mind (in the guise of will) or from purely mechanical causes, when either alternative seems a priori possible?

For Descartes, the dominion that the pineal gland exercises over the body is far from total. For our purposes, however, it is unnecessary to sort out exactly how or which body movements are governed or determined, in whole or part, by the conarium. It suffices to recognize that Descartes seems to have believed that the pineal gland plays little or no role in the causation of certain body movements over which we have either little or no voluntary control, e.g., fingernail growth, blushing, circulation of the blood, and perhaps even what is nowadays called the startle response. These body movements in which the conarium has little or no involvement are nonetheless mechanically determined; it’s just that the pineal gland is bypassed, as it were, in their causation. So, when we say such things as that there is a pineal-gland motion corresponding to every natural movement of the body, the reader should understand us to be talking about those movements or motions of the body in which the conarium allegedly plays a causal role. These movements include all those nowadays called voluntary, along with a host of involuntary ones as well.

We contend that Descartes recognized, at some times more clearly than at others, that what is true of individual movements or motions need not hold for unbounded (infinite in our parlance) or open-ended ensembles of such movements. Coupled with his belief in the limited or finite character of body and in the unlimited or unbounded character of mind (whether in the guise of will or in that of producer of thoughts), the foregoing principle
steered Descartes uncircuitously to his Language Test and his Action Test. For, as we will soon see, the Language Test turns not on individual utterances, any single one or even any finite number of which could be explained mechanically, but on unbounded or open-ended repertoires of such utterances, the causation of which outstrips corporeal capacity and so requires mind—in the guise of a substance that has thoughts—in Descartes’s eyes. Similarly, the Action Test turns not on individual actions, any one or any finite number of which could be explained mechanically, but on unbounded or open-ended repertoires of such actions, the causation of which outstrips corporeal capacity and so invokes mind—in the guise of will—by Descartes’s lights.

We have at last arrived at our explanation why Descartes took his Two Tests to be diagnostic of mind. The Language Test and the Action Test are not designed to detect individual non-mechanical motions, for no such test is possible. Rather, the Two Tests are designed to detect, as the potential output of an agent, an ensemble or family of motions the unbounded character of which transcends the causal capacity of matter and hence of mechanical causation. In the case of the Language Test, this family of motions consists of the unbounded ensemble of sentences that answer to the boundless diversity of utterances that could be addressed to the agent, for Descartes recognized that there is no limit to the number of possible questions or the number of linguistic contexts in which a subject might be expected to produce an appropriate linguistic response. In the case of the Action Test, what outstrips mechanical causation is the infinite ensemble of actions that correspond to the boundless variety of circumstances that an agent might have to face.

IV. SECOND CRITERION OF EXEGETICAL ADEQUACY: WHY DID DESCARTES ADVANCE THESE TWO TESTS?

The fact that Descartes advanced two quite different tests as touchstones for mind leads to our second criterion of exegetical adequacy:

(2) To be adequate, an interpretation of the Two Tests must explain why Descartes advanced both a language test and an action test as touchstones of mind.

Once again, this criterion might strike the reader as jejune, but it is far from being so. To our knowledge, no commentator has ever explained why Descartes advanced both a language test and an action test as touchstones of mind.

Everyone acknowledges that Descartes’s tests are meant to discriminate
minded beings from mindless ones. For Descartes, thought is the essential and exclusive activity of mind, so the tests are clearly intended to discriminate thinking entities from non-thinking ones, or, as we might say, the thought-ful from the thought-less. It is imperative to note that, for Descartes, there are exactly two kinds or types of thoughts:

Having thus considered all the functions belonging solely to the body, it is easy to recognize that there is nothing in us which we must attribute to our soul except our thoughts. These are of two principal kinds, some being actions of the soul and others its passions. Those I call its actions are all our volitions, for we experience them as proceeding directly from our soul and as seeming to depend on it alone. On the other hand, the various perceptions or modes of knowledge present in us may be called its passions, in a general sense, for it is often not our soul which makes them such as they are, and the soul always receives them from the things that are represented by them.41

For Descartes, then, thoughts are simply the passions and the actions of the mind or soul. Perceptions or cognitions (in the broadest senses of these terms) are its passions, and volitions are its actions. Thus the challenge facing Descartes was to devise a means of distinguishing perceptive (cognitive in the broad sense) entities from non-perceptive ones, and of distinguishing volitional entities from volitionless ones. For Descartes, our perceptions are expressed in language, and our volitions are realized in actions. Accordingly, Descartes designed his Language Test to demarcate perceptive entities from non-perceptive ones, and his Action Test to distinguish agents with volitions from agents without them. It should surprise no one, therefore, that Descartes advanced two tests for mind, one relating to perceptions (mental passions) and the other relating to volitions (mental actions). Given his dichotomous classification of thoughts, it would have been a colossal surprise if Descartes had advanced only one test for mind. For example, had he advanced only his Language Test, it would have been incumbent on him to explain why there could be no test for mind that turns on volitions when there was a test that turns on perceptions. That is, Descartes would have had to explain why mental actions (volitions) could not play the demarcation role that another species of thought—mental passions (perceptions)—could play. And mutatis mutandis if he had advanced only the Action Test.

The foregoing considerations pose an embarrassment to commentators like Keith Gunderson and Margaret Wilson, who aver that Descartes eventually abandoned his Action Test while embracing his Language Test to the end.42 To be credible, such commentators need to explain what makes volitions ill suited, or at any rate less well suited than perceptions, to ground a Cartesian test for mind. To date, no one has done this. Nor, in view of our analysis below, is anyone likely to do so.
V. THIRD CRITERION OF EXEGETICAL ADEQUACY: DOCTRINAL CONSISTENCY

Of our eight criteria of exegetical adequacy, the following is undoubtedly the most widely recognized—at least implicitly—but probably also the one most often violated:

(3) To be adequate, an interpretation of Descartes’s Two Tests must be consistent with his other doctrines.

It is one thing to recognize the consistency criterion but quite another to conform to it. Violations can crop up in unsuspected ways, even in places seemingly remote from the text or episode under scrutiny. For an instructive example, we draw on Gordon Baker and Katherine Morris’s penetrating study of Descartes’s dualism.

What has become the received interpretation of Descartes’s views about animal sentience was expressed by La Mettrie thus: “Descartes denies all consciousness, all faculty of feeling to his machines, or to the matter of which he supposes that animals are uniquely made.” Gunderson is one of many commentators who attribute to Descartes the “doctrine of the bête machine—the view that animals other than man are pure machines devoid of thought or feeling.” As Gunderson succinctly puts it, for Descartes, “it was a contradiction to suppose that machines could think or feel.” Contra this orthodoxy, Baker and Morris contend that Descartes took “sentience” to be “mechanically explicable.” To shore up their avowedly idiosyncratic interpretation, Baker and Morris advance an analysis of the meaning of sen­tience predicates that is supposed to illuminate the difference that Descartes draws between human sensation and perception on one side and animal sensation and perception on the other. But unhappily for Baker and Morris’s analysis, the resulting doctrine turns out to be incompatible with Descartes’s views about the substantial union of mind and body, views central to his system of philosophy.

Baker and Morris claim that Descartes purported to discover a systematic ambiguity of sentence predicates (they call them S-predicates). Every S-predicate is alleged to have two senses, a rational sense and an animal sense:

The two senses of each S-predicate are given separate explanations [by Descartes]. In each case, the animal sense is clarified in terms of bodily structure and movement; Descartes held, in effect, that there are “behavioural criteria” for applying any S-predicate in the animal sense. The rational sense of each predicate is explained on the basis of its animal sense according to a uniform pattern: “x Φ₂” means “x thinks or judges that he Φ₁.”

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Thus, “x feels pain₂” (“x feels pain in the rational sense”) is analyzed as “x judges that x feels pain₁” (“x judges that x feels pain in the animal sense”). But for you to think or judge that you feel pain in the animal sense is altogether of a piece with your thinking or judging that your neighbor feels pain in the animal sense. That is to say, Baker and Morris’s analysis places you no closer to your own pain than to your neighbor’s pain. But this consequence turns the union of mind and body into that of pilot to ship, precisely what Descartes insisted it is not. Recall what Descartes says about the body-mind union in the Sixth Meditation:

Nature also teaches me, by these sensations of pain, hunger, thirst and so on, that I am not merely present in my body as a sailor is present in a ship, but that I am very closely joined and, as it were, intermingled with it, so that I and the body form a unit. If this were not so, I, who am nothing but a thinking thing, would not feel pain when the body was hurt, but would perceive the damage purely by the intellect, just as a sailor perceives by sight if anything in his ship is broken. Similarly, when the body needed food or drink, I should have an explicit understanding of the fact, instead of having confused sensations of hunger and thirst. For these sensations of hunger, thirst, pain and so on are nothing but confused modes of thinking which arise from the union and, as it were, intermingling of the mind with the body.

In view of “the high degree of integration of his [Descartes’s] ideas,” Baker and Morris declare that “there is no quick way to achieve a clear view of his conception of a person as the substantial union of a body with a rational soul. We will see this in good light only once dawn has broken over the whole landscape of his thinking.” Baker and Morris evidently believe they have wrought such a dawning, for they later congratulate themselves on having forged a new understanding of Descartes’s views about the substantial union of the rational soul (mind) and the human body. They purport to explicate Descartes’s views on human nature and its welfare in terms of divinely decreed mind-body correlations that determine how the mind is affected by the body, and the body by the mind. In particular, sensation and sense-perception supposedly issue in a confusion of thoughts that for the most part promotes the welfare of the mind-body unit. But what Baker and Morris’s account fails to do is to make your pain any more intimately yours than your neighbor’s pain—except that certain sentience claims (in the animal sense) about your own body bubble up quasi-spontaneously in your mind alongside other judgments and volitions providentially related thereto. The stark externality of your pain to yourself is highlighted by the following (somewhat tentative) assertion by Baker and Morris:

We can perhaps extend this notion of Naturally confused thoughts to some sensations arising from the external senses, at
least in cases where welfare is conspicuously involved. I may not make any distinction between seeing that a tree is about to fall on me, a feeling of fear, and the desire to get out of the way; or between feeling the ground giving way under my feet and the desire to get away from the edge of a cliff; and so on. 54

For example, when caught in a gale, I may not make or draw any distinction between seeing that my sailboat is about to capsize, my feeling of fear, and my strong desire to keep it from going over. This confused knot of thoughts and passions doubtless contributes to the safety of both me and my vessel, but it does nothing to alter the fact that I am related to my sloop as a sailor to his ship. Similarly, I may not make or draw any distinction between seeing that a tree is about to fall on you, my feeling of fear, and my desire for you to get out of the way—a confusion on my part that promotes the welfare of your mind-body unit—but the excruciating pain you are going to feel when the tree crushes your legs is nevertheless yours and yours alone, no matter how vivid my fear or how lively my concern for your well-being.

VI. FOURTH CRITERION OF EXEGETICAL ADEQUACY: FIDELITY TO FRENCH AND LATIN TEXTS

It might be thought that our fourth criterion of interpretative adequacy is so obvious that no one needs to be reminded of it. But the fact that interpretations of Descartes’s Two Tests run afoul of it with depressing regularity prompts us to make it explicit:

(4) To be adequate, an interpretation of Descartes’s Two Tests must be faithful to his French and Latin texts.

We remarked above that the Radners’ account of Descartes’s Two Tests rests on mistranslation—astonishingly, on the mistranslation of a single word, “salam,” in the Latin phrase “ad solam cogitationem,” which occurs in Descartes’s 5 February 1649 letter to Henry More. With evident approval, the Radners cite the following translation by Anthony Kenny of the relevant portion of this letter:

Yet, although all animals easily communicate to us, by voice or bodily movement, their natural impulses of anger, fear, hunger and so on, it has never yet been observed that any brute animal reached the stage of using real speech, that is to say, of indicating by word or sign something pertaining to pure thought and not to natural impulse. Such speech is the only certain sign of thought hidden in a body. All men use it, however stupid and insane they may be, and though they may lack tongue and organs of voice; but no animals do. Consequently it can be
taken as a real specific difference between men and dumb ani-
mals. (our italics)\textsuperscript{55}

The Latin text corresponding to the italicized phrase reads thus: \textit{"ut aliquid vel voce vel nutibus indicaret, quod ad solam cogitationem, non autem ad impetum naturalem, posset referri."}\textsuperscript{56} We translate it thus: "that by voice or signs it [the animal] indicates something that can be traced back to thought alone, and not to natural impulse."

Kenny's mistranslation of \textit{"ad solam cogitationem"} becomes unmistakable when attention is paid to the context of the passage. In the aforementioned letter to More, Descartes prefaces his remarks about animals lacking thought with the following observation:

But after I had come to notice that one must distinguish two diverse principles of our [bodily] motions: namely, one clearly mechanical and corporeal, which depends solely on the force of the [animal] spirits and the arrangement of our [bodily] mem-
bers, and which could be called the corporeal soul; the other incorporeal, namely, the mind or that soul which I have defined as a thinking substance, I then very diligently investigated whether the motions of animals arose from these two principles or out of just one of them only. And when I saw clearly that all of their motions could arise solely from that principle which is corporeal and mechanical, I took it as certain and demonstrated that in no way can we prove that there is a thinking soul in brutes.\textsuperscript{57}

The above passage makes clear that moments later when Descartes trots out a version of his Language Test, \textit{his concern is whether there are any bodily movements traceable to thought alone.} The notion that Descartes is concerned here with pure thought is, therefore, an artifact of mistranslation. And this mistranslation is the engine that drives the Radners' ill-founded interpretation of Descartes's tests for mind. Apart from the fatal flaws already noted, the Radners' pure-thought interpretation of the Language Test ill coheres not only with the uncritical version of the Language Test but also with its critical version [vide infra]. No legitimate stretch of imagination could enable one to construe any of the several formulations of the Language Test as relating to disquisitions on mathematics and metaphysics, which the Radners themselves recognize as the domain of pure thought.\textsuperscript{58}

Baker and Morris's idiosyncratic theory of Descartes's alleged discovery of ambiguity in sentience-predicates is grounded in substantial part in the ten-
dentious reading they give to the Cottingham-Stoothoff-Murdoch translation of the following terse passage from the \textit{Principles of Philosophy},\textsuperscript{59} the sparse Latin of which is wide open to competing translations and interpretations:

\textit{By the term 'thought', I understand everything which we are aware of as happening within us, in so far as we have awareness}
of it. **Hence, thinking** is to be identified here not merely with understanding, willing and imagining, but also with sensory awareness. For if I say ‘I am seeing, or I am walking, therefore I exist’, and take this as applying to vision or walking as bodily activities, then the conclusion is not absolutely certain. This is because, as often happens during sleep, it is possible for me to think I am seeing or walking, though my eyes are closed and I am not moving about; such thoughts might even be possible if I had no body at all. But if I take ‘seeing’ or ‘walking’ to apply to the actual sense or awareness of seeing or walking, then the conclusion is quite certain, since it relates to the mind, which alone has the sensation or thought that it is seeing or walking.

Whatever else it might be, a tendentious construal of a translated text is hardly mistranslation. The unacceptability of Baker and Morris’s interpretation of the foregoing English translation must be established on quite different grounds from those on which a verdict of mistranslation rests. Here, then, is our own translation of this same Latin text, which lends itself less readily to Baker and Morris’s misinterpretation:

By the word “thought” I understand all those things which, we being conscious, happen in us, insofar as there is consciousness of them in us. Therefore, not only are understanding, willing, and imagining the same here as thinking, but so is perceiving. For if I say “I am seeing, therefore I exist,” or “I am walking, therefore I exist,” and I understand these statements to be about vision or ambulation that is effected through the body, the conclusion is not absolutely certain. For, as often happens in dreams, I can think that I am seeing or that I am walking, even though I don’t have my eyes open and even though I am not moving about; and possibly I can think these things even though I should have no body. But if I understand these statements to be about the very perception or consciousness of seeing or walking, the conclusion is obviously certain because it is then referred to the mind which alone perceives or thinks that it is seeing or that it is walking.

It is a large and dubious step from this passage to the ambiguity of sentience predicates. What Descartes appears to us to be saying is something like the following. I can use the sentence “I am walking” to mean that I am engaged in ambulation. When I use “I am walking” thus, the conclusion “I exist” is not certain (though the inference to it is valid) because I could be wrong about the truth of my premise. But I can also use “I am walking” to mean that I think I am walking. When “I am walking” is so used, the conclusion “I exist” becomes certain because I could not be wrong about the truth of the premise so understood. No ambiguity is hereby attributed to sentience predicates or to any other lexical items. In lieu of the alleged ambiguity of certain lexical items (Baker and Morris’s sentience predicates),
what we actually encounter in Descartes is a claim that certain sentences can be used in two ways. In one use, “I am walking” means that I am walking about. In the other use, “I am walking” means that I think I am walking about. In the jargon of modern grammar, Descartes’s analysis can be formulated thus: the surface sentence “I am walking” can be derived from two deep structures, one corresponding to “I am walking” and the other to “I think I am walking.” In the derivation of the surface sentence from the second deep structure, a deletion transformation causes the sentience verb (the main verb) to disappear. The same is true, mutatis mutandis, for “I am seeing” and similar sentences.

Notice that in the Cartesian paraphrase of the second use of the sentence “I am walking,” an implicit present-tense sentience-verb with first-person subject is made explicit. So understood, Descartes’s analysis bears a notable similarity to the Performative Thesis advanced by the linguist James R. Ross on purely syntactical grounds. According to Ross’s Performative Thesis, the main verb of every declarative sentence is an implicit present-tense performative verb akin to “say” or “state,” together with a first-person subject (and a second-person indirect object). For example, on Ross’s thesis, the underlying syntactic source (deep structure) of Descartes’s sentence “I am walking” becomes something like “I say (to you) that I am walking.” The surface sentence “I am walking” results from the underlying source-sentence via what Ross calls a performative deletion transformation. Like Descartes, Ross invokes no lexical ambiguity, but invokes instead a deleted underlying (implicit) performative verb (and first-person subject and second-person indirect object) that vanishes at the level of surface structure.

VII. FIFTH CRITERION OF EXEGETICAL ADEQUACY: DESCARTES’S ATTITUDE TOWARD THE ARGUMENT FROM ANALOGY

Descartes recognized that, throughout the history of Western thought, the driving force behind philosophical claims that animals have humanlike minds has been analogical argumentation. After distancing himself from Montaigne and Charron, who claimed that humans differ more among themselves than they do from beasts, Descartes in his 1646 letter to the Marquess of Newcastle concedes that the analogical argument from the similarity of animal sense organs to human sense organs lends at least some plausibility to the proposition that animals have thoughts similar to human thoughts:

One can say only that while beasts perform no action that persuades us that they think, nevertheless because their bodily organs are not much different from ours, one could conjecture
that there is some thought associated with these organs, just as we experience in ourselves, although theirs be much less perfect. To this I have nothing to reply except that if they should think as we do, they would have an immortal soul just as we do. But this is implausible, for there is no reason whatsoever to believe it of some animals without believing it of all of them, and a number of them are too imperfect for us to believe this of them, e.g., oysters, sponges, etc.\footnote{4}

The same concession is made even more directly in Descartes's 1649 letter to Henry More:

But although I take it as demonstrated that one cannot prove that there is any cogitation in brutes, I do not think on this account that one can prove that there is none at all, since the human mind does not reach into their hearts. But in examining what is most probable here, I see no argument that militates in favor of thought in brutes other than the following one: since they have eyes, ears, tongue, and the rest of the sense organs we possess, it is plausible that they perceive like we do; and since thought is included in our manner of perceiving, similar thought must be credited to them. This argument, since it is maximally obvious, has taken hold of the minds of all men from infancy. However, there are other arguments—much more numerous and stronger, but not so obvious to everyone—that clearly support the contrary position. Among these arguments is the following: it is less probable that worms, flies, caterpillars, and other animals possess immortal souls than that they are moved entirely mechanically.\footnote{5}

Clearly, then, Descartes acknowledged that the analogical argument from human minds to animal minds possesses some probative force. Yet by denying minds to animals, Descartes famously rejected the conclusion of this argument from analogy. These reflections lead to our fifth criterion of exegetical adequacy:

(5) To be adequate, an interpretation of Descartes's Two Tests must make sense of Descartes's rejection of the analogical argument to animal minds.

Descartes was acutely sensitive to the theological implications of analogical arguments for animal minds, and for good reason. Since the Catholic Church taught that humans were the only animals with immortal souls, Descartes was not at liberty to advocate a contrary conclusion—even if he had been inclined to do so (and he was not). We must not forget that Descartes was exceedingly proud of his proof of the "immortality" of the human soul, i.e., his proof that there is no reason to deny that minds are naturally incorruptible substances, i.e., beings that cease to exist only when the Creator withdraws His sustaining power from them. For Descartes, any
creature with a mind is similarly immortal; it possesses a soul (a mind) no less fit to be joined to God in eternal ecstasy than is the human soul. So if animals have minds, they too have immortal souls. In the case of such lowly animals as oysters, sponges, flies, and pismires, Descartes took this conclusion to be a *reductio ad absurdum*. He went even further, labeling the claim that animals and humans have the same kind of souls (minds characterized by thought and volition) the morally worst error after atheism:

> For, after the error of those who deny God . . . there is none that distances weak minds from the narrow path of virtue more than to imagine that the soul of beasts is of the same nature as ours, and that consequently we have nothing to fear, nor to hope for, after this life—any more than do flies and pismires. On the contrary, when one knows how much they [human souls and animal souls] differ, one grasps much better the reasons that show that our soul is of a nature wholly independent of the body and, consequently, that it is not at all subject to die with it. Then, to the degree that one sees no other causes that destroy it, one is naturally inclined to judge from this that it is immortal.66

Notice the species bias in Descartes’s assessment of the proposition that animal souls do not differ in kind from human souls. Rather than infer that animals are thereby elevated, he concludes that humans are thereby degraded. Much the same species bias surfaces in his 1649 letter to More in which Descartes defends his theory of animals as machines against the charge of callousness toward animals. Descartes pleads that his “opinion is not so much callous towards beasts as it is kindhearted towards men . . . whom it verily absolves from the suspicion of crime whenever they eat or kill animals.”67

In his February 1649 letter to More, Descartes formulates a *doubly analogical argument* to similarity of animal and human perceptions from similarity of animal and human sense organs, and from similar animal and human perceptions to similar animal and human minds. Descartes thinks this analogical argument—actually, a sequence of two analogical arguments—is obvious, but that it is opposed by many stronger but less obvious arguments. One of these opposing arguments holds that it is more probable that worms, flies, and caterpillars move purely mechanically than that they have minds. But, according to Descartes, the principal reason for thinking beasts lack minds is that, although animals resemble humans in that some individual animals are more perfect than their conspecifics, and although they have no difficulty expressing their passions to us, yet no animal has ever been observed to use true speech: to wit: “that by voice or signs it [the animal] indicates something that can be traced back to thought alone, and not to natural impulse.”68 Descartes closes his letter by saying that there are additional reasons for denying mind to animals, but he omits them for the sake of brevity.
Surprisingly, Margaret Wilson takes the February 1649 letter to More to signal a sea change in Descartes’s attitude toward animal minds:

By the end of his life, then, Descartes has backed off from his earlier position that the supposed explanatory redundancy of the attribution of reason to beasts “proves” that they do not think at all, in favor of the far weaker claim that we cannot prove that they do think. And he has himself enunciated an argument that he now takes to have some weight on the other side, having to do with the resemblance of their organs to ours, though he continues to hold that the balance of reasons is on his side.69

We disagree with Wilson. Descartes’s “far weaker claim that we cannot prove that they [animals] do think” evinces no change of mind on his part. It relates, rather, to Descartes’s quip that we cannot see into the hearts of animals. We explained the significance of this remark above. It concerns the farfetched possibility that animals have minds but nonetheless always go along with their bodies, i.e., the hyperbolically imagined state of affairs in which animals have minds but all their actions happen nevertheless to be mechanically determined because they never use their free wills to do something other than what the mechanical influences on them cause them to do. Descartes recognized this hyperbolical possibility from the beginning, and thus never claimed more than moral certitude for his proofs that animals lack minds.

But Wilson is right about Descartes’s formulating “an argument that he now takes to have some weight on the other side, having to do with the resemblance of their organs to ours,” namely, Descartes’s doubly analogical argument to animal thoughts based on the similarity of animal sense organs to human sense organs, and of animal sense-perception to human sense-perception, but she offers no evidence that Descartes had not previously conceded probative force to analogical arguments. Indeed, Wilson’s forthright admission that Descartes continued “to hold that the balance of reasons is on his side” itself supplies one of the principal reasons why Descartes never bothered to stress the probative force of analogical arguments elsewhere (other than in his 1646 letter to the Marquess of Newcastle), for as he himself puts it, “there are other arguments, stronger and more numerous, but not so obvious to everyone, which strongly urge the opposite.”70 Note, too, that Descartes—like Hume after him—thinks that the force of analogical inference to animal minds is patent to everybody. Why, then, should Descartes have belabored the obvious by expressly insisting that analogical arguments to animal minds be accorded some probative force? And why should we now believe with Wilson that Descartes overlooked such an obvious and relevant matter until late in his life?

A more astonishing claim about Descartes’s views on analogical inference to mind is made by Sue Savage-Rumbaugh, Stuart Shanker, and Talbot
Taylor in their recent book *Apes, Languages, and the Human Mind*. Referring to the last sentence of a passage from the piece-of-wax section of the *Second Meditation*, namely: “And so something which I thought I was seeing with my eyes is in fact grasped solely by the faculty of judgement which is in my mind.” these authors assert the following:

This last sentence is crucial to understanding Descartes’s theory of cognition. He is arguing that we cannot see the internal causes of someone else’s behavior, and there is nothing in the behavior itself that displays whether it is mentally caused. Yet we normally talk and act as though the people with whom we are dealing are conscious human beings and not automatons. What this means, Descartes concludes, is that, unbeknownst to us, our mind must infer—or rather, the faculty of judgment in our mind must infer—on the basis of the similarity it observes between an organism’s behavior and our own behavior, that S’s actions are mentally caused.

If these authors mean merely that Descartes believed that analogical reasoning is what prompts the vast majority of people to credit other humans with minds, then their claim is certainly true. But if they mean—as context strongly suggests—that Descartes thought that the philosophical case for other human minds rests on analogy, then their claim hits about as wide of its mark as is possible.

There is a notable and seemingly eccentric feature of Descartes’s attitude toward the argument from analogy, namely, that he takes it to be an all-or-none affair. That is to say, Descartes thinks that the analogical argument to mind applies with equal cogency to all animals—oysters, worms, pismires, and sponges included. But in the philosophical tradition to which Descartes was heir, the strength of analogical arguments was thought to depend on the closeness of the similarities affirmed in the premises. Consider, for example, Montaigne: “[T]here is no reason to imagine that the beasts do, through a natural and enforced instinct, the same things that we do by choice and skill. From like results we must infer like faculties (and from more abundant results, more abundant faculties).” Why, then, did Descartes adopt a maverick position that appears to hold that degree of similarity is irrelevant when it comes to the inference by analogy from human minds to animal minds?

Referring to the argument from analogy, Gunderson believes that “Descartes did propose a valid argument against a certain view (typical of Montaigne and others) that animals are able to think and reason.” In an imaginative attempt to explain and defend Descartes’s rejection of the argument from analogy, Gunderson opines that “we should simply acknowledge that similar end results can be brought off in very different ways,” an observation that appears to undercut the argument from analogy.
seems to view what he takes to be Descartes's reasons for rejecting the an­
alogical argument to animal minds as an important part of Descartes's legacy:

Though admittedly Descartes' brand of argument [about the uni­
versal instrumentality of reason] does not prove that in principle
a machine could never be conscious, think, or feel, . . . it does at
least bring out the inadequacy of the Montaigne-type of reason­
ing . . . when . . . considered adequate in [itself] for showing that
animals or computers are capable of thought and intelligence.76

For the sake of greater perspicuity, we skip ahead in time to consider
David Hume's formulation of the principle of analogical argument in
Section IX, "Of the Reason of Animals," in his *An Enquiry concerning
Human Understanding*:

All our reasonings concerning matter of fact are founded on a
species of ANALOGY, which leads us to expect from any cause
the same events which we have observed to result from similar
causes. Where the causes are entirely similar, the analogy is per­
fect, and the inference, drawn from it, is regarded as certain and
conclusive. . . . But where the objects have not so exact a simi­
larity, the analogy is less perfect, and the inference is less con­
clusive; though still it has some force, in proportion to the
degree of similarity and resemblance.77

Hume's example of a "certain and conclusive" inference founded on
*perfect analogy* (total similarity) is the inference to the heft and cohesion­
of-parts of a piece of iron from past experience with pieces of iron display­
ing these properties. Hume's example of *imperfect analogy* is the
less-conclusive but still probative inference in anatomy from the observed
circulation of blood in one animal species to its circulation in all san­
guineous species.78

The foregoing raises a question that any adequate interpretation of
Descartes's Two Tests must answer: Why did not Descartes regard the ana­
logical argument to mind as being more cogent—as having significantly
more probative force—in the case of apes and monkeys than in the case of
worms, flies, caterpillars, oysters, pismires, and sponges? Surely the degree
of similarity between human and monkey sensory organs, and between
human and monkey perception, is much higher than that between human
and oyster sensory organs and between human and oyster sensory percep­
tion, or than that between human and sponge sensory organs and between
human and sponge perception, and so on. By traditional canons of logic, the
argument from analogy carries much greater cogency when applied to mon­
keys and apes than when applied to oysters or sponges. So why didn't
Descartes accept these canons or recognize these elementary logical facts?

The answer, in our judgment, is quite revealing: Descartes took the ana­
logical argument to oyster (or sponge) minds to be *essentially the same*
argument as the analogical argument to monkey minds. Consequently, he attributed the same degree of probative force to all analogical arguments to animal minds. By thus lumping together all these analogical arguments, Descartes could and did dismiss the argument by analogy to animal minds as a reductio ad absurdum, where the proposition that oysters (or sponges or pismires) possess minds plays the role of the absurdity.

But why would Descartes consider all these analogical arguments to be mere variants of one basic argument? What could possibly justify such a stance? To answer this question, we must remember the thrust of Descartes’s mechanistic program. However simple the external actions and sensory apparatus of an oyster might be, for Descartes the former were basically the same as human actions, and the latter worked in basically the same way as the human sensory apparatus does. That is to say, external motions are communicated to the oyster’s nerves, which then affect the motions of its animal spirits, which in turn cause its muscles to move in ways that result in appropriate oyster actions, e.g., opening or closing its shell at an opportune place and time, and similarly for oyster sense perception. In short, the functioning of the oyster body-machine is fundamentally the same as the functioning of the human body-machine; the two differ only in irrelevant complexity. Recall that Descartes considered the operation of the hydraulic automata in the Royal Gardens to be similar enough to the functioning of the human body to provide an instructive model thereof. From Descartes’s mechanistic perspective, there was no functional difference worth mentioning between these hydraulic automata and human bodies. So the fact that Pelecypoda, the class of mollusca to which oysters belong, have a simple nervous system with only three pairs of ganglia and two pairs of long nerve cords would (if he had known these facts) have caused him little embarrassment where the argument from analogy is concerned. For Descartes, the analogical argument to oyster minds was essentially the same as that to monkey minds. Of course, he would have had to finesse the fact that the oyster lacks a brain, a trifle for a theoretician as neurologically and anatomically imaginative as Descartes.

A pair of analogies will help us understand Descartes’s all-or-none attitude toward analogical arguments to animal minds. First, suppose we construct a Turing computer and program it with a universal Turing program. The Turing computer is a rudimentary device that scans a square on a two-dimensional tape and detects whether the square is blank or has a stroke printed on it. The machine can be instructed to print a stroke or erase a stroke on the scanned square of the tape, or to scan one square to the left or one square to the right, and then to go execute some numbered instruction. Its program consists of about one hundred four-part instructions <A,B,C,D>, where A is the number of the given instruction, B indicates the
state of the square scanned (being blank or having a stroke printed on it), C indicates whether to move right or left one square or to erase or print a stroke on the scanned square, and D indicates the numbered instruction to be executed next. Inputs and outputs are given by a simple code that relates sequences of strokes and sequences of such sequences to whole numbers and to sequences of whole numbers. (If desired, the code could relate the marks on the tape to letters and punctuation marks as well.) This is a pretty rudimentary computer, yet in a mathematically precise sense the Turing computer can do anything that a modern supercomputer can do—albeit more slowly. In a philosophically important sense, then, there is no relevant difference between the Turing computer and the supercomputer. For example: as a matter of logic, anyone willing to say that the supercomputer can think must be prepared to say that the Turing computer can think, too. That is to say, the Turing computer stands to the supercomputer in the same relationship that Descartes took the oyster to stand to the monkey. As with Descartes’s oyster and monkey, the only relevant difference between the Turing computer and the supercomputer is irrelevant complexity.

The second helpful analogy comes from Donald Griffin, who avers that “One reason to suspect that nonhuman animals do experience conscious thoughts is that the basic structure and functioning of neurons and synapses are quite similar, as far as we know, in all animals with organized central nervous systems.” That is to say, the analogical inference to conscious mind that is grounded in the similarity of central nervous system components holds as much for lowly creatures like ants as it does for higher animals like chimpanzees. From this analogical point of view, ants stand to chimpanzees in the same relationship that Descartes’s oysters stand to his monkeys. Philosophically speaking, the mechanical similarities attributed by Descartes to animals present us with an all-or-none situation.

The old saw that one thinker’s modus ponens is another’s modus tollens never applied more aptly than to Descartes’s and Hume’s views on the force of analogical argumentation to animal minds. Both philosophers took the argument by analogy to animal minds to be obvious, but there agreement ends. Unlike Descartes, Hume thought the argument was irresistibly strong when applied to higher animals. And Hume would surely have agreed with Descartes that sponges and oysters lack minds—but for very different reasons. For Hume, the similarities of oyster bodies and actions to human bodies and actions were too scant and too faint to support an inference to mind that musters significant plausibility. In the Treatise Hume puts forward his “Touchstone” in the science and philosophy of mind, i.e., his methodological precept mandating that mental operations common to humans and animals receive the same explanatory treatment: “When any hypothesis, therefore, is advanced to explain a mental operation, which is common to
men and beasts, we must apply the same hypothesis to both; and as every true hypothesis will abide this trial, so I may venture to affirm, that no false one will ever be able to endure it." For example, if humans and rhesus monkeys become depressed when severely maternally deprived, and if this depression in human infants is explained in terms of repressed anger, then rhesus monkey depression must also be explained as repressed anger. It would be hard to devise a more anti-Cartesian principle than Hume's Touchstone. And yet, in a Pickwickian-Boolean sense, Descartes could wholeheartedly endorse Hume's Touchstone. Why? Because for Descartes there are no mental operations common to humans and animals.

VIII. SIXTH CRITERION OF EXEGETICAL ADEQUACY:
TESTS THAT DESCARTES DID NOT ADVANCE

We begin by formulating what we shall call the Silver Blaze strategy after the equine character in one of Conan Doyle's Memoirs of Sherlock Holmes. In this eponymous memoir, Holmes has been asked to help locate the racehorse Silver Blaze, who has disappeared from his stall several days before the running of the prestigious Wessex Cup race in which he is the heavy favorite. Discussing the case with the famous detective, Inspector Gregory of Scotland Yard asks Holmes whether he wishes to draw the inspector's attention to anything, to which Holmes retorts, "To the curious incident of the dog in the night-time." A perplexed Gregory protests that "The dog did nothing in the night-time," to which Holmes laconically replies, "That was the curious incident." The perspicacious sleuth is alluding to the fact that the dog in the stable did not bark—as it would have been expected to do if during the night strangers had entered the stable and removed Silver Blaze from his stall (the hypothesis on which Inspector Gregory has been proceeding). Holmes is intimating that the horse was not abducted by strangers but was taken from his stall by a person or persons familiar to the dog. Holmes's observations are meant to highlight the significance and importance of non-events—not of just any non-events, of course, but of non-events that there was good reason to expect to take place.

The Silver Blaze strategy—to attend to things that should have happened but did not (Holmes calls them curious events) and to explain why—ought to be part of the armamentarium of every historian of philosophy. Unfortunately, few seem aware of it and even fewer employ it. Below we apply the Silver Blaze strategy to tests for mind that Descartes might reasonably have been expected to advance, but in fact did not advance, and we incorporate the strategy into our adequacy conditions thus:
To be adequate, an interpretation of Descartes’s Two Tests must identify tests for mind that Descartes might plausibly have been expected to advance but in fact did not, and then explain why.

The first of these “curious incidents” concerns the role of will in overcoming natural impulses, especially the passions. We saw in Section III that Descartes was convinced that animals always act on their natural impulses, or at least on the strongest of these impulses when they conflict. But unlike animals, we humans are not in thrall to our natural impulses. Free will enables us to resist them, and even to act contrary to them, by bringing about motions that are not mechanically determined. Descartes attached great importance to this liberating aspect of human action. Its importance to the moral realm is obvious, but it is no less important to the epistemic domain where free will enables us to avoid error by resisting our natural proclivity to make judgments that go beyond what we clearly and distinctly perceive. So in the overcoming of natural impulses we seem to have a detectable difference between humans and animals, one well suited to ground a test for mind. Descartes might himself have formulated a Natural Impulses Test for (animal) mind along these lines: “The third [of these very certain means of distinguishing mindless animals from minded ones] is that animals are unable to resist their natural inclinations, as we sometimes do when we exert our wills to overcome our natural impulses.” But the fact remains that Descartes did not formulate such a test. The question, then, becomes why not?

Descartes had a sophisticated understanding of animal training or animal conditioning (classical or Pavlovian conditioning). For example, he opines that by beating a dog half-a-dozen times while a violin is being played, one will have trained or conditioned the dog to whine and run away at the sound of a violin. And he notes that a hunting dog (a setter) can be trained or conditioned to run toward the sound of a gunshot and to refrain from running toward a wounded partridge, although the dog’s natural inclinations are quite opposite, namely, to run away from the gunshot and to run toward the wounded bird. That is to say, Descartes was fully aware that animals can be trained or conditioned to act against their natural impulses. But this fact seems to undermine any test for mind that is based on overcoming natural impulses. For how could a Cartesian investigator tell whether an animal had overcome its natural impulses through training or conditioning rather than through the exercise of free will?

A possible solution suggests itself. Descartes thought that training or conditioning works by generating a habit in the trained or conditioned agent. But numerous repetitions seem to be needed to establish a habit. So, by invoking the agent’s life history, one could make the requisite discrimination in the following way. If the agent’s life history reveals a foundation
in repetition for a habit that opposes the natural impulse at issue, then the agent might have overcome its natural impulse through habit rather than through free will. But if the agent’s life history reveals no such foundation for a relevant habit, then one may legitimately conclude that the agent exercised free will to overcome its impulses. For example, if a hunting dog who has never experienced gunfire or similar loud noises runs toward the report when a gun is fired nearby, one may infer that the dog exercised free will to overcome its natural impulse to run away.

But Descartes would find several flaws in this “solution.” First, it presupposes that the investigator has epistemic access to the total life history of the agent; otherwise, the investigator could not rule out the possibility that the latter had acquired through repetition a habit that relevantly trumps the natural impulse. But complete knowledge of an agent’s life history is unobtainable, so the Natural Impulses Test would have theoretical value only; it would be an “in principle” touchstone inapplicable to actual cases. From a pragmatic perspective, then, the Natural Impulses Test would be worthless in contradistinction to the more serviceable Language Test and Action Test.

Second, Descartes’s theory of habit formation will not permit him to embrace the aforementioned “solution.” Although aware that habits typically arise from repeated actions, Descartes believed that habits are sometimes established in a single episode:

It is also instructive to note that, although the motions of the [pineal] gland which, along with those of the [animal] spirits and the brain, represent certain objects to the soul, are joined by Nature to motions that excite certain passions in the soul, the former motions can nonetheless be divorced from the latter via habit and joined to other very different motions; moreover, the habit can be acquired in only one action and does not at all require prolonged repetition. For example, if someone unexpectedly encounters something exceedingly foul in some meat that he is eating with relish, the shock of this experience can so change the disposition of the brain that thereafter the person will no longer be able to look at such meat without feeling revulsion, whereas formerly he savored it. Moreover, one can observe the same phenomenon in beasts. 94

According to Descartes’s analysis of this example, the shock of finding on a single occasion something loathsome in meat that a person has been eating with relish can somehow establish a firm association between this type of meat and the feeling of disgust or aversion occasioned by the revolting item. That is, a single disagreeable episode can create a new habit in the diner that displaces or overrides his former disposition to savor meat of the given sort.

Consider again the hunting dog who runs toward the sound of the first gunfire it has ever heard. Is the dog thereby exercising free will in acting
against its natural impulse to run away from loud noises? Clearly, the inference to free will is warranted only if Descartes can eliminate acquired habit as a possible determinant of the dog’s “unnatural” behavior. But there seems to be no way for him to do this. From Descartes’s perspective, the shock to the dog’s nervous system occasioned by this single terrifying episode might have modified the neural correlations instituted by Nature in such a way that the auditory perception of gunfire at close range is now joined in the dog to a strong desire to run toward the noise. But how might this new association realistically have been formed? We need only posit some circumstance forceful enough to redirect the dog’s flight toward the gunshot rather than away from it. It is easy to imagine such circumstances. For example, we might suppose that the dog’s master had fired the gun and that the terrified dog had then instantly sought the safety and comfort of its master’s presence, terror somehow creating in the dog a firm association between gunfire and a strong desire to run toward it—the direction of safety and comfort—just as horror effected the new association between perception of the contaminated meat and a feeling of revulsion in Descartes’s hapless diner. The upshot of these considerations for Descartes is this. To establish free action, the Cartesian investigator must do more than rule out acquired habit by eliminating any foundation in repetition from the life history of an agent that has acted against its natural impulses. Since habits can be established in a single incident, the Cartesian investigator must also scrutinize every episode in the agent’s life history that involves, in any way, the given natural impulse in order to ascertain whether any relevant counternatural habit could have been formed. And this examination would have to probe every circumstance of every such episode to determine whether any of them could by itself have given rise to a relevant counternatural habit. What previously seemed merely impractical now begins to appear utterly fanciful. Is it any wonder, therefore, that Descartes did not put forth a Natural Impulses Test for (animal) mind?

Two other tests for (animal) mind that a commentator might well expect Descartes to have advanced are a Non-Mechanical-Motions Test and a Pineal-Gland Test. The nature and ultimate unsatisfactoriness of this pair of tests—and thus the reasons why Descartes did not advance them—have already been explained in detail in Section III.

So far as we can discern, then, there remains only one plausible candidate for being a Cartesian test for (animal) mind; we shall call it the Overmuch-Success Test. Descartes might have formulated it somewhat like this:

The third [of these very certain means of distinguishing mindless animals from minded ones] is that animals regularly meet with such wondrous success in their actions that they could not be acting through a universal instrument like reason, as we do,
but they must rather be acting through particular bodily dispositions [dedicated mechanisms] that produce their particular actions with superior efficacy.

The Overmuch-Success Test is foreshadowed in some of Descartes’s earliest thinking, thinking that endures to the end of his life. For example, in his 1619–21 intellectual notebooks, Descartes writes: “From the fact that certain actions of animals are so exceedingly perfect, we suspect that they do not possess free will.”95 And in his 1646 letter to the Marquess of Newcastle, Descartes declares: “I know full well that the beasts do many things better than we do, but I am not surprised by it. For this very fact serves to prove that they act naturally and by means of springs, like a clock that indicates the actual time much better than our judgment informs us of it.”96

The Cartesian thinking behind the Overmuch-Success Test is straightforward. A universal instrument, i.e., an instrument able to direct any sort of action in any circumstances, will prove successful across the entire range of action, although the degree of success may vary considerably from very high to just barely successful. Reason is itself such an instrument. The greater the rational agent’s reason, therefore, the more its actions will fall toward the highly successful end of the spectrum. But only an agent that incorporates bodily dispositions designed to produce exquisite success in well-defined circumstances, i.e., well-designed dedicated mechanisms, can consistently achieve superior success, and then only across a narrow range of actions. But many animals conspicuously outperform humans in some of their actions, so if they were acting through reason, their reason would have to be markedly superior to ours. But although these animals do outperform us in some actions, they fail to achieve superior success across even a moderately wide action range: this limitation shows that they act through their bodily dispositions and not through a universal instrument like reason. (The Radners indirectly testify to the authenticity of this Cartesian line of reasoning by castigating Descartes for the unfairness of his tests for mind. Animals, they say, are damned if they do achieve success, but also damned if they do not.)97

But the Overmuch-Success Test has an Achilles heel. What rules out the possibility that the superior success of animals might be the result of their reason being much greater than ours? If they perform their actions through the universal instrumentality of reason, and if their greater success were due to their greater reason, they would do at least as well as we do in the rest of their actions. But in fact we find that they fail miserably in these other actions, i.e., they flounder ineffectually. It is the incongruous coupling of smashing success in some of their actions with abject failure in many others that convicts them of acting, not through reason, but through a number of bodily dispositions (dedicated mechanisms), one for each action they per-
form so admirably. It is not just their wondrous success by itself, but this
success in tandem with abject failure, that eliminates them as rational
agents. Accordingly, we revise the Overmuch-Success Test to reflect these
considerations, and we rename it the Success-cum-Failure Test. It can be
formulated in Cartesian fashion thus:

The third [of these very certain means of distinguishing mindless from minded animals] is that, unlike us who act through the
universal instrumentality of reason, animals regularly meet with
wondrous success in some actions but flounder ineffectually in
many others. This coupling of abject failure with striking suc-
cess shows that they act from the disposition of their organs, for
no animal could have so many dispositions built into it to enable
it to act successfully across the entire range of human action, as
reason enables us to do.

But take a moment to review Descartes's first formulation of the Action Test
in Section II. You will find that the Success-cum-Failure Test and the Action
Test are the same test! Our ruminations on success lead to the critical role of
failure, and the conjunction of success and failure yielded the Action Test.

Margaret Wilson construes the kind of failure that, when coupled with
sterling success, convicts animals of mindlessness as trying but falling short,
and she suggests that Descartes might himself have come to recognize a
problem (apropos the Action Test) with his claim that reason is a
universal instrument:

Indeed all of us "fall short" in a considerable range of activities,
beside those that we are disqualified from by obvious bodily
limitations. This presents a problem for precisely interpreting
the claim, prominent in Descartes's account of the second
"means," that reason is "a universal instrument." It is just possi-
ble that Descartes came to recognize this problem; for in later
life he cites the language test alone.98

Weighing heavily against Wilson's suggestion is the fact that Descartes
nowhere hints at, much less actually mentions, any "problem" concerning
the instrumental universality of reason. Rooted in the scholastic tradition,
Descartes probably just took it for granted that reason was a universal
instrument in practical matters.

Pace Wilson, trying but falling short fails to be failure enough for
Descartes. Ineffectual floundering—as in Jones floundered ineffectually at
the task—is what combines with exquisite success to yield the Cartesian
verdict of mindlessness. Henceforth, we shall use the expression abject fail-
ure as a quasi-technical term to denote this distinctive Cartesian kind of fail-
ure. To get as clear as possible about it, we must look at Descartes's
paradigmatic illustration: the alleged fact that dogs scratch the ground with
their paws in order to bury their excrement but almost never succeed in
doing so. “And, finally, the [simian] instinct to bury their dead is no more strange than that of dogs and cats which scratch the ground in order to bury their excrement, although they almost never actually bury it. This last fact shows that they do this only by instinct and without thinking about it.”

The point of Descartes’s example is this. What makes reason a universal instrument is its unlimited scope; it can succeed in any means-end task so long as some means adequate to the end lies within the power of the reason-endowed agent. That is to say, no such means-end task falls outside the competence of practical reason. Consider now the allegation that burying its excrement falls outside the dog’s competence. The dog clearly has the means or ability to bury its excrement; after all, it has no trouble burying large bones. So, if the dog possessed reason and if it wanted to bury its excrement, the dog could readily perform the task, i.e., it could easily figure out how to bury its excrement and then do so. Furthermore, its numerous attempts make it appear that the dog really does want to cover its excrement. Nevertheless, the dog always fails miserably to bury it—unless *per accidens* it happens to scratch in soft soil or sand in such a way that its excrement becomes thinly covered. The dog, therefore, lacks reason; it is a mindless agent, a natural automaton that acts solely from the disposition of its organs. Whereas it does some things extremely well, the dog abjectly fails to cover its excrement because it lacks not only reason but also a bodily disposition—a well-designed dedicated mechanism—for doing so.

Charles Darwin also speculated on the same bit of canine behavior but tentatively reached a markedly different conclusion:

Dogs after voiding their excrement often make with all four feet a few scratches backwards, even on a bare stone pavement, *as if for the purpose of covering up their excrement with earth*, in nearly the same manner as do cats. Wolves and jackals behave in the Zoological Gardens in exactly the same manner, yet, as I am assured by the keepers, neither wolves, jackals, nor foxes, when they have the means of doing so, ever cover up their excrement, any more than do dogs. All these animals, however, bury superfluous food. Hence, if we rightly understand the meaning of the above cat-like habit, of which there can be little doubt, we have a *purposeless remnant of an habitual movement*, which was originally followed by some remote progenitor of the dog-genus for a definite purpose, and which has been retained for a prodigious length of time.

Where Descartes read into this canine behavior an intention or purpose on the part of the dog to cover its excrement, Darwin saw purposelessness, interpreting the behavior as an evolutionary vestige of once purposeful behavior that had lost its original purpose without having yet acquired another. So who is right? Is canine feces-covering behavior truly purposeless, or does it have a purpose that eluded even Darwin?
According to Bruce Fogle, a contemporary veterinarian and animal-behaviorist, the behavior is not only purposeful but successful as well:

Males and females [dogs] will sometimes mark their urine or faeces by scratching at the earth around them. These marks act like arrows pointing at the marker as well as spreading the scent around. It’s also possible that another scent is left at the site from the sebaceous glands between their toes. The damage that scratching does to the nearby vegetation will also be evident to the sensitive noses of other passing canines.101

Fogle speculates that canines use their feces [and urine] as information-laden calling cards which they deposit at strategic sites. And to be sure that other canines will not overlook these cards, they erect prominent “arrows” or “signs” that point to them. (These arrows or pointers may include olfactory information supplemental to that in the feces or urine.) From Fogle’s perspective, then, behavior that looked contemptibly ineffectual to Descartes and purposeless to Darwin turns out to be not only purposeful but successful. Fogle agrees with Darwin up to—but not including—the point where the latter says that this contemporary remnant of once purposeful behavior is now purposeless. Fogle would amend Darwin’s conclusion by noting that the behavioral remnant has acquired a new communicative purpose. For, as Konrad Lorenz points out:

The conservative persistence of behavior patterns, even after they have outlived, in the evolution of a species, their original function, is exactly the same as that of organs; in other words, they can become "vestigial" or "rudimentary," just as the latter can. Or, on losing one function, they may develop another, as the first gill slit became an ear opening when our ancestors changed from aquatic to terrestrial life.102

Since it was Darwin who first demonstrated evolutionary change of function in vestigial behaviors, his characterization of canine excrement-covering behavior as purposeless is somewhat ironic:

Darwin shows in the most convincing manner that analogous processes have taken place in the evolution of motor patterns, as for instance, in the case of “snarling,” in which an expression movement with a purely communicative function has developed out of the motor pattern of actual biting which, as a means of aggression, has practically disappeared in the human species.103

Descartes suggests that animals fail abjectly in many things, perhaps even in most, so it is regrettable that he gives only one example of abject action failure, namely, canine (and feline) excrement-covering behavior. When Descartes says that animals are taken in by lures and traps, he cannot be referring to abject failure because he also says that humans are deceived in this way, too, and sometimes even by ruses perpetrated by animals.104 Not
surprisingly, then, the main obstacle to understanding Descartes’s views about animal action failure is the paucity of pertinent examples. As Wilson justly remarks:

It is notable that neither Descartes nor any of his opponents has much to say in detail about the behavior of non-human animals. All sides seem to rely on a very few crude examples: often, banal instances of dogs’ behavior, and sometimes birds’, are taken to suffice, I can’t say to what extent this limitation is tied to an actual lack of available observational data, as opposed to lack of curiosity and scholarship.105

Does Descartes think that animals fail abjectly in many or even in most cases of action failure? We simply cannot be sure. We can be confident only that Descartes thought that all animals fail abjectly whereas humans fail often but never abjectly. For if humans did fail abjectly, the inference to mindlessness would be as justified for them as it is for animals. But had Descartes taken an unbiased look at human action, he would have found numerous instances of abject failure. A homely example noted by Darwin is the effort humans universally make to influence the trajectory of a projectile (e.g., a golf ball or a billiard ball) by means of so-called body English.106 We humans fail to influence the object’s motion in this manner as abjectly as dogs do when they “try” to cover their excrement. Noting that there are “innumerable other instances” of apparently ineffectual human behaviors, Darwin offers an example from his own behavior to show how “irrational” human actions can be:

I put my face close to the thick glass-plate in front of a puff-adder in the Zoological Gardens, with the firm determination of not starting back if the snake struck at me; but, as soon as the blow was struck, my resolution went for nothing, and I jumped a yard or two backwards with astonishing rapidity. My will and reason were powerless against the imagination of a danger which had never been experienced.107

The primatologist Hans Kummer notes that failure to recognize that a behavioral system has properties beyond the adaptive ones shaped by natural selection often induces animal observers to form seemingly sensible but utterly wrong expectations:

This commonly happens to ethologists, because although behavioral systems have evolved to an overall state of improved adaptation, in their individual manifestations they can be about as unreasonable as a screw in a jeep door. When vibration has loosened it a little bit, it becomes even looser instead of screwing itself tighter. Both a behavioral system and a screw have characteristics besides those for which they were designed.108

It is these collateral properties and relations that lead to action failure generally, and to abject failure in particular—in humans no less than in animals.
With respect to the nature and significance of animal failure and success, Descartes once again set the future scientific and philosophical agenda, right down to the present. Moreover, contemporary analyses of animal failure often fall short of his sophistication. For, as Griffin has observed, "scientists have been very quick to seize upon any failure of an animal to perform with perfect efficiency and to offer such failure as evidence that it is a totally thoughtless robot."¹⁰⁹ The impressive tree-felling-and-harvesting behavior of beaver, for example, is not perfectly efficient:

Some trees are cut halfway through and then abandoned, others lean against neighboring trees as they begin to fall, so that the beaver obtains no food at all. Beaver do not seem to realize in such cases that by felling the tree against which the first tree has lodged they could obtain a double supply of bark [for food] rather than nothing at all.¹¹⁰

Griffin notes that although it is "easy for us to judge from inspection of beaver works that they could have accomplished their apparent objective with much less work than was actually expended," it is nevertheless the case that "lack of perfect efficiency in accomplishing an operation does not prove the lack of any conscious plan."¹¹¹ In other words, the familiar inference from action inefficiency to mindlessness is unwarranted.Were it warranted, none of us humans could rightly be credited with minds. However, as Griffin laments, scientists and philosophers typically employ a double standard: "we tend to infer a total lack of thinking when animals do something foolish and wasteful of effort. But we do not apply the same standard to members of our own species, and we never infer a total absence of thinking when people behave with comparable foolishness."¹¹²

Failing to discriminate abject failure from inefficiency, contemporary thinkers are quick to infer mindlessness from actions that betoken mere inefficiency. This is especially true when the animals are so-called lower animals such as insects. Consider, for example, the complex burrow-construction-and-provisioning behavior of sand wasps (Ammophila campestris), which dig their burrows in sandy ground:

These wasps close the opening with small stones. . . . Then the wasp searches for and captures a caterpillar. . . . She paralyzes it by stinging it in several places and carries it on the wing to the burrow. There she opens the entrance, drags the caterpillar down to the nest chamber and only then lays an egg. Paralyzed caterpillars survive well enough that the growing larvae can eat them.¹¹³

What happens if the construction-and-provisioning behavior is interrupted in ways unlikely to occur in nature, e.g., if the paralyzed caterpillar is moved while the female wasp is busy reopening the burrow? Having reopened it, she looks about until she has found the missing prey which she then drags back to the burrow. So far so good; quite sensible behavior. But
experiments have shown that the wasp then oftentimes repeats the entire sequence of depositing the caterpillar near the entrance and digging an entrance—even though the burrow has already been opened by her!

This has often been taken as evidence that the entire pattern is rigidly programmed genetically, and the further assumption is customarily added that for this reason the wasp cannot possibly think consciously about what she is doing. . . . We can immediately see what the insect ought to do to accomplish her general objective; and when she fails to do this, and instead repeats what would ordinarily be appropriate behavior in this abnormal situation, we tend to conclude that she is a mindless robot. 114

Griffin helpfully reminds us that in many other situations, insects do behave sensibly and even efficiently. Griffin contends that undue emphasis has been placed by inclusive behaviorists on the examples of stupid behavior, and because many insects often fail to adjust their behavior after abnormal experimental disturbances, we have overgeneralized such inefficient behavior into a dogmatic conclusion that no insect ever thinks consciously about its activities. 115

But is the repetitive behavior of the sand wasp merely inefficient or does it exemplify abject failure? Does the beaver’s “stupidity” in not felling a tree against which another has lodged qualify as inefficiency or as abject failure? More fundamentally, is there a genuine and useful distinction to be drawn between inefficiency and abject failure? This is just one of the many important questions Descartes has bequeathed to science and philosophy.

Failure and success are opposite ends of a single spectrum, so perhaps we can learn more about Descartes’s conception of animal action failure by exploring his views about their action success. It augurs well for this enterprise that Descartes supplies more examples of animal action success and action superiority than of animal action failure and action inferiority. Moreover, he thinks that animals outperform us not just now and then, but in all those actions that we perform mindlessly, which constitute the great bulk of what we do.

Margaret Wilson’s misconstrual of Descartes’s claim that reason is a universal instrument leads her to dismiss as mere hyperbole Descartes’s oft-repeated claim that animals meet with greater success in some of their actions than we do. 116 By contrast, Gunderson offers an account of the universal instrumentality of reason that “preserves the core of what he [Descartes] is claiming when he writes about certain performances of beasts that ‘the fact that they do better than we do, does not prove that they are endowed with mind, for in this case they would have more reason than any of us, and would surpass us in all other things’.” 117 Gunderson’s account turns on the portability of practical reason. He argues that in cases where a
“we should be safe in making certain further assumptions about the machine’s general capabilities and performances, just as in the case where we know that a man can do X and must thus be able to do a number of other things as well.” For example, criminal investigators rightly assume that a human being who can bury a suitcase can also bury a human body, for the two tasks are comparable from the side of practical reason. Similarly, if animals acted from reason, a dog that could bury a bone would also be able to cover its excrement easily. Therefore, when we see a dog that has buried large bones flounder pathetically in apparent attempts to cover its excrement, we are entitled to conclude that it does not operate through reason but solely through bodily dispositions. Gunderson summarizes this portability-of-reason argument thus:

The point in a thimble is this: if the machine or animal is only capable of doing that one thing [e.g., to find its way from Princeton to Capistrano after only a glance at a road map; to bury a bone] better than us, or in a way comparable to the way in which we do it, this is an excellent reason for revising our explanation of how that animal or machine does what it does. Gunderson’s choice of words is misleading. He does not mean to be talking only about an animal or machine that does exactly one thing as well or better than humans—a clock’s keeping accurate time, for example. The animal or machine might do many things as well or better than we do, but so long as it fails to perform, with comparable success, cognate actions that it would easily be able to do if it were acting from reason, we are justified in demanding a non-rational explanation of its behavior. But apart from his emphasis on comparable success rather than on abject failure, Gunderson has deftly captured Descartes’s intent. Still, to put matters exactly right, Gunderson should have said that an animal or machine might do many things as well or better than we can, but so long as it fails abjectly when it tries to perform cognate actions that it would easily be able to do if it were acting from reason, we are justified in demanding a purely mechanical explanation of its behavior.

Despite its plausibility, a substantial and rapidly growing body of empirical evidence for the modularity of the mental tells against the portability-of-reason argument. For example, some calculating prodigies are imbecilic in much or most of what they do or try to do. Some nanocephalic dwarfs have sophisticated linguistic abilities alongside markedly diminished mental abilities. Some people with William’s syndrome speak fluently and grammatically despite being severely retarded. And, dually, there is a rare genetic defect that causes well-defined linguistic deficits, such as the inability to understand past and future tenses or to form plurals, yet its sufferers exhibit otherwise normal intelligence. Cases similar to that of
Phineas Gage show that "a normal social-knowledge base . . . with preserved higher-order neuropsychological functions such as conventional memory, language, basic attention, basic working memory and basic reasoning" is compatible with seriously compromised abilities to plan for the future, to conduct oneself according to accepted social rules, and to decide prudently on courses of personal action. Anosognosics who cannot recognize that the entire left side of their bodies is paralyzed may have excellent perceptual, linguistic, and reasoning abilities. And when it comes to intelligent, cultivated, and linguistically sophisticated persons with normal vision, but unable to recognize familiar objects, who will ever forget the distinguished musician, Dr. P., who went to shake hands with a grandfather clock that he had mistaken for Oliver Sacks and who tried to put his wife’s head on his own in the belief that it was his hat?

According to Gunderson, Descartes “suggests that the only cases where beasts surpass us in their behaviour are cases analogous to those actions of ours which are not directed by our thoughts, but are purely automatic (such as sleepwalking).” But Descartes does not merely suggest this; he asserts unqualifiedly that animal superiority is limited to actions we perform mechanically: “I consider that they [other animals] equal or surpass us only in those of our actions that are not directed by our thought.” Because reflection and reasoning notoriously degrade action, Descartes’s claim is quite astonishing. Consider the difference between a novice and an experienced automobile driver. What the beginner does clumsily and haltingly through reason and reflection, the experienced driver does smoothly, efficiently, and mindlessly. Similarly, we often exploit the superior ability of animals to compensate for our inferior abilities, e.g., we let a horse or dog find the way home through the woods for us rather than deploying our reason to try to find it ourselves. An apologist for Descartes might protest that in relying on the horse or dog we are using our reason to find the way home. But suppose the dog and the man are taken alone on different days to the center of a large forest and left there to find the way home. Who would doubt that the dog would succeed better than the man? Moreover, Descartes himself notes that a clock keeps time more accurately than we can with all our vaunted reason. Are we then to believe that keeping time is something we do mindlessly?

Descartes’s clock illustration purports to show the superiority of mechanically caused action over reason-based action, so why does it not count as a counterexample to his claim that animal superiority is limited to actions we perform mindlessly? Why did Descartes not say that animals often prove superior to us in those actions, common to them and us, which we perform through reason? First, let’s consider a prior question: What made Descartes think that animals equal or surpass us in many of the
actions we perform “automatically” or “mindlessly,” actions in which our reason plays no part? Descartes’s 1646 letter to the Marquess of Newcastle has to be read against Montaigne’s Apology for Raymond Sebond, in which Montaigne sets out his views that animals think and reason like humans, and that humans are worse than some animals but better than others. Having extolled the intricate organization of bee society, the nest-building skills of birds, and the web-spinning expertise of spiders, Montaigne remarks that “[w]e recognize easily enough, in most of their works, how much superiority the animals have over us and how feeble is our skill to imitate them.” Then he immediately goes on to ask derisively, “Why do we attribute to some sort of natural and servile inclination these works which surpass all that we can do by nature and by art?” Montaigne also makes detailed claims of superiority and inferiority, e.g., that our natural weapons are better than those of some animals but worse than those brandished by others. He even suggests that it is natural for us to make weapons of wood and iron. His observation that it is natural for us to arm ourselves with wood and iron points in the direction of one plausible answer to our question. Although the natural weapons of many animals are vastly superior to our puny ones (teeth, fists, etc.), when we employ our reason to arm ourselves we produce weapons superior to any of those brandished by animals (some of whom also use and even manufacture weapons).

Descartes’s claim about animal superiority concerns actions, so let’s consider some important ones: obtaining food, hunting, treating injury or disease, etc. No animal is as successful in obtaining food as humans are through agriculture, animal husbandry, and fishing, all activities suffused with human reason. Nor is any animal as successful at hunting as humans who have applied their reason to the enterprise. Nor can any animal treat its injuries or diseases as successfully as humans can. And so on. That is to say, no matter what action common to humans and animals we consider, the application of human reason has made humans more successful at it than any animal. But to return to an earlier example, can’t horses and dogs find the way home much better than we can? Yes, of course, but only if we are left to our naked selves. When equipped with compass, maps, global position finder, etc., the human will find the way home better than the animal. But a Cartesian might still object that some animals run faster or swim better than humans will ever do. Granted, but conceptualize these actions more generally. For running, substitute getting from one place to another overland; for swimming, substitute moving from one place to another through water without submersion. By virtue of their reason, humans can get from one place to another overland better than animals (thanks to roads, carriages, etc.), and move over the water more quickly (thanks to boats, motors, etc.). Only by circumscribing the action narrowly can one ensure
the “superiority” of animals. But there is no evidence that Descartes ever entertained such a circumscribed or restricted notion of animal superiority or animal parity. We conclude, therefore, that Descartes meant that humans, by means of their acumen and inventiveness, surpass animals in every type of action that humans perform through reason.

But there is another possible way to understand Descartes’s astonishing claim about the scope of animal superiority. Let’s call an action **strictly automatic** if the only way we can perform it is mindlessly, and **neutral** if we can perform it both mindlessly and through reason. For example, Descartes might have believed digestion of food to be strictly automatic but walking to the marketplace neutral. Finally, let’s call an action **strictly rational** if we cannot do it mindlessly but can do it only through reason. For example, expressing your thoughts to someone about an event in the remote past is a strictly rational action. Now, when Descartes says that animal superiority is limited to the actions humans perform mindlessly, he may have meant that while animals often equal or surpass us in strictly automatic and neutral actions, they never equal or surpass our strictly rational actions. Why not? Because creatures without minds lack the wherewithal to perform such actions. That is, Descartes’s claim that animals can do better than humans only in those actions that we perform mindlessly might mean that animals can perform not only strictly automatic actions but also neutral actions as well or better than we can—but only when we happen to be performing the neutral actions mindlessly. But this interpretation is not only a stretch; it also still faces the problem of thought degrading action. The preceding interpretation, therefore, seems preferable.

**IX. SEVENTH CRITERION OF EXEGETICAL ADEQUACY: WHY DID DESCARTES CHANGE HIS MIND ABOUT HIS TWO TESTS?**

Margaret Wilson claims that Descartes embraced the Language Test to the end of his life, but that he eventually abandoned the Action Test. 136 Agreeing in part, Gunderson claims that Descartes favored the Language Test over the Action Test, but never abandoned the latter altogether. 137 Scholarly claims and disagreements like these lead to a preliminary statement of our seventh criterion of exegetical adequacy:

To be adequate, an interpretation of Descartes’s Two Tests must explain his change(s) of mind or attitude toward them.

As just formulated, the criterion presupposes that Descartes did in fact change his mind or heart about these tests. We will argue, however, that
Descartes never changed his position, but whether one takes sides with Wilson and Gunderson or with us, it would be better to formulate the criterion in a way that avoids the presupposition. Accordingly, we amend our seventh criterion thus:

(7) To be adequate, an interpretation of Descartes's Two Tests must explain his change(s) of mind or attitude—if any—toward these tests.

Let's consider first the evidence for Wilson's claim and thus also evidence for the aforementioned presupposition. According to Wilson "It is just possible that Descartes came to recognize this problem [the problem of taking reason to be a universal instrument]; for in later life he cites the language test alone." In some late correspondence touching upon animal minds, Descartes does present his Language Test alone. More tellingly, he then sometimes speaks of it as the only possible test for thought. Isn't this pretty compelling evidence for Wilson's claim?

The strongest evidence for Wilson's claim that Descartes ultimately credited only the Language Test is his 1646 Letter to Henry Cavendish, Marquess of Newcastle, which reads in relevant part thus:

Finally, there aren't any of our external actions that can assure those who examine them that our body isn't just a machine which moves itself but that there is also in it a soul which has thoughts—with the exception of words or other signs made about subjects that are raised, without being connected to any passion.

Descartes is clearly asserting that speech is the only external action that shows that the human body is not just a self-moving machine but also harbors a mind with thoughts. We contend that Descartes here understands *thoughts* [*pensées*] as mental passions, and so intends to bracket volitions. Ask yourself whether Descartes would have said that speech is the only external action that shows that the human body is not just a self-moving machine but is also home to a soul with volitions? There is no reason to think so. What Descartes is saying is that *there is only one test to establish that a body contains a mind that has perceptions* (thoughts as mental passions), namely, the Language Test. He is *not* saying that there is only one test to establish that a body harbors a mind *simpliciter*, for anything characterized by mental actions (volitions) is a mind no less than something characterized by mental passions (perceptions). The Action Test is designed to detect the former (volitions), just as the Language Test is designed to detect the latter (perceptions). So Descartes does not omit the Action Test because it cannot detect the presence of mind; he omits it because it does not (directly) detect the presence of perceptions (mental passions). Thus Descartes's claim that the Language Test is the only possible test is relative

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to a particular purpose, namely, to determine whether a subject has thoughts in the sense of perceptions!

The Silver Blaze strategy also bids us to reject Wilson’s claim that Descartes ultimately abandoned his Action Test. Given both the systematicity of Descartes’s thinking and his vanity concerning it, one would expect him not only to announce a change of mind on any matter as important as his tests for mind, but also to justify the change and to trace its implications for his views generally. But one finds nowhere in Descartes any retraction of the Action Test or any explanation why volitions—the actions of the mind or soul—cannot demarcate minded from mindless organisms when perceptions—the passions of the soul—can do so. On the contrary, Descartes continues to refer interested parties (readers and correspondents) to Part Five of his Discourse on Method—the locus classicus of the Two Tests—for an exposition of his views. Wilson has no explanation for these “curious incidents,” but we do. Starkly put, Descartes never abandoned his Action Test.

Gunderson claims that in later life Descartes came to believe that “the use of language was the only infallible way of distinguishing men from beasts with respect to rationality.”140 Gunderson adds that it “seems that [Descartes] simply regarded the former [the Language Test] as more certain and important than the other [the Action Test], not the other as having no worth at all.”141 Gunderson offers no evidence to support his claim that Descartes eventually came to view the Language Test as the sole infallible way to demarcate men from beasts “with respect to rationality.”142 But, as we saw in Section III above, Descartes rejected the suggestion that either test was infallible. Although the supposition is so improbable as to be incredible, an organism with a mind might always do what its body prompts it to do, thereby causing itself to fail both the Action Test and the Language Test. Or it might perversely refuse to reveal that it has a mind. These observations also explain something that Wilson finds puzzling, namely, that in late life Descartes dissociates himself from strong claims about proving that animals lack minds and concedes that the issue cannot be settled with finality.143 Here again, Descartes’s late stance is no different from his early one.

With respect to the Two Tests, both Wilson and Gunderson fail to note pertinent manifestations of tentativeness elsewhere and earlier in Descartes’s writings. Such tentativeness appears already in his earliest writings, e.g., when Descartes avers that “the perfection of some animal actions makes us suspect they lack free choice.”144 More significantly, in his second set of Replies Descartes says the following:

For, since animals lack reason, it is certain that they have no perfection which is not also present in inanimate bodies; or, if they do have any such perfections, it is certain that they derive
them from some other source, and that the sun, the rain, and the earth are not adequate causes of animals.\textsuperscript{145}

But this tentativeness is tentativeness for the sake of argument only. Although convinced that the perfections of animals can be accounted for mechanically, Descartes momentarily indulges his opponent by entertaining the supposition that some animal perfections cannot be explained mechanically. He does this only to draw the conclusion that these hypothesized perfections must then arise from outside the corporeal realm.

Similarly, Wilson reads too much into the qualifier "perhaps" in article 50 of \textit{Passions of the Soul}:

And one can observe the same thing [namely, a habit-induced modification of the correlation between nervous system movements—motions in the brain, animal spirits, or pineal gland—and passion movements] in beasts, for although they have no reason at all, \textit{nor also perhaps any thought}, all the movements of the animal spirits and the [pineal] gland that excite passions in us do not fail to be present in them. \ldots \textsuperscript{146}

It is important to remember that, while rationality was traditionally denied to animals, sensations and perceptions—items that qualify as \textit{thoughts} for Descartes—had traditionally been ascribed to animals. The qualifier "perhaps" is thus better read as a sop to the traditional reader than as the expression of change of mind or retreat on Descartes’s part.

Claims like Gunderson’s that Descartes came eventually to view the Action Test as fallible presuppose that there was a time when he deemed it infallible. We will show that from the outset Descartes insisted that his Action Test generated only moral certainty, and that he never deviated from this position. When Descartes says that something is \textit{morally certain} he means that it has "sufficient certainty for application to ordinary life, even though [it] may be uncertain in relation to the absolute power of God."\textsuperscript{147} To say that something is \textit{morally possible}, therefore, is to say that its negation is not morally certain. Similarly, \textit{moral impossibility} amounts to moral certainty of the negation of the proposition. \textit{Moral certainty} contrasts with the \textit{absolute certainty} that "arises when we believe that it is wholly impossible that something should be otherwise than we judge it to be."\textsuperscript{148} Already in the \textit{Discourse}, Descartes claimed apropos his Action Test that "it is \textit{morally impossible} that there should be enough diversity [of dispositions] in a machine to make it act in all the contingencies of life in the same way that our reason makes us act."\textsuperscript{149} In other words, even in the \textit{Discourse} Descartes claimed only moral certainty, not absolute certainty or infallibility, for his Action Test.

We marshal one last bit of evidence that seems decisive against Wilson’s and Gunderson’s claims about Descartes having distanced himself
from the Action Test. In his 5 February 1649 letter to Henry More, Descartes sketches an abbreviated version of the Language Test, extolling it as the “preeminent argument” [*praecipua ratio*] for the proposition that animals lack thought. But Descartes goes on to say that for brevity’s sake he omits other arguments for the same conclusion. Does this apology sound like the comment of someone who has abandoned his other test for animal mind?

It is notoriously hard to prove a negative, e.g., to prove that Descartes did *not* change his mind or heart about his Action Test. But recall what Sherlock Holmes was fond of saying, namely, that having eliminated all but one of a comprehensive set of hypotheses, one must embrace the survivor no matter how improbable it might be in itself. What holds for criminal detection holds also for textual interpretation. That is, the credibility of an interpretative hypothesis must be judged, not in isolation from competing hypotheses, but relative to or against all its competitors. Once the competitors have been eliminated, there is no rational alternative to accepting the survivor, no matter how antecedently improbable it may have seemed. For example, our espousal of the no-change-of-mind-or-heart hypothesis is grounded in an independent dismissal of the competing hypotheses about the Action Test, notably Wilson’s reconsideration hypothesis and Gunderson’s preference hypothesis. (We believe these two hypotheses may justly be taken as proxies for all plausible alternatives to our own hypothesis.) Through *Holmesian elimination*, therefore, we arrive at our no-change-of-mind-or-heart hypothesis.

X. EIGHTH CRITERION OF EXEGETICAL ADEQUACY: HOW ARE THE TWO TESTS RELATED?

Can a subject pass one of Descartes’s Two Tests and fail the other? Is either test a special case of the other? Commentators differ on these matters. Gunderson, for instance, holds that the Language Test is a special case of the Action Test; hence, to fail the Language Test is *eo ipso* to fail the Action Test, whereas to fail the Action Test does not *entail* failure of the Language Test:

For all Descartes needs in order to show that S has not passed the so-called action test is that there is some (broad) range of actions where S (machine or beast, for example) fails to perform in ways comparable to the ways in which human beings perform. (It would not of course work the other way: failure to pass the action test would not entail failure to pass the language test.)

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What Gunderson appears to mean is that whatever actions or behaviors count for Descartes as failing the Language Test also count as failing the Action Test, whereas some actions or behaviors that count as failing the Action Test do not also count as failing the Language Test. In particular, we do not take Gunderson to be claiming that, for Descartes, an organism could fail the Action Test but nevertheless pass the Language Test. Mary Midgley, by contrast, believes that the Two Tests overlap symmetrically in some unexplained sense.\textsuperscript{154} Clearly an acceptable interpretation of the Two Tests ought to get their relationship right. This consideration leads to our eighth and final criterion of exegetical adequacy:

(8) To be adequate, an interpretation of Descartes’s Two Tests must explain how the two tests are related.

To explore their relationship, we need clear formulations of the Two Tests. The intuitive version of his Language Test, which was set out in Section II, speaks of using and composing words or other signs in order to declare one’s thoughts to someone. But what does it mean to use and compose words to convey thoughts to others? How can one tell whether an animal, a machine, or a human is doing it? Recognizing that a serviceable test for mind requires more clarity and precision than this intuitive version of the Language Test affords, Descartes immediately supplemented it with the following critical formulation:

\textit{Critical formulation of the Language Test:} For one can readily conceive that a machine might be made in such a way that it produces words, and even in such a way that it produces some words relevant to corporeal actions that effect a change in its organs, e.g., if one touches it in a certain place, it will ask what one wishes to say to it; and if one touches it in another place, it will exclaim that one is hurting it, and the like. But one cannot conceive that the machine could arrange words so diversely as to respond to the meaning of all that might be said in its presence, as even the most stupid human beings can do.\textsuperscript{155}

The critical formulation of the Language Test concedes that a clever engineer could build a machine that not only utters words but even utters them relevantly to actions that affect it. What the Language Test rules out is a machine that could make an appropriate or relevant verbal response to anything at all that might be said in its presence. What might be said in its presence constitutes an unbounded or infinite set of utterances. Descartes allows that a machine could be fabricated to respond relevantly to any bounded or finite number of utterances—although when this finite number becomes large, he expressly doubts that a sufficient number of mechanisms could be built into the machine to generate all the needed responses.\textsuperscript{156} What outstrips the capacity of a machine and therefore requires a mind to generate
the appropriate responses is the unbounded or infinite character of the utterances that might be addressed to it and of the situations in which they might be tendered. Therefore, if one encounters a subject that responds appropriately to numerous questions, statements, and imperatives addressed to it in a rich variety of situations and contexts, one has compelling evidence of a mind at work.\footnote{157} This evidence warrants only moral certainty, of course, but moral certainty so strong as to shade into absolute certainty. But what if such evidence is not forthcoming despite our best efforts to obtain it? We ought then to conclude that the subject fails the Language Test and therefore in all probability has no mind, i.e., we may then infer with moral certainty that the creature is mindless. It's possible, of course, that a mind-endowed subject could fail the Language Test by feigning mindlessness or by refusing to engage in dialogue with us, but the probability of such an event is remote.\footnote{158} And when one considers a large class of subjects, e.g., the set of animals, the supposition that they all have minds but for one reason or another fail the Language Test becomes so improbable as to be incredible.

The terminology of medical diagnostic testing may help clarify how the Two Tests are related. A diagnostic test for some feature $F$ in a group $G$ of subjects is said to be $x$ percent sensitive for $F$ in $G$ if and only if (in the long run) of every 100 randomly selected members of $G$ who have $F$, $x$ of them will test positive for $F$ (true positives) and $100-x$ of them will test negative for $F$ (false negatives). For example, suppose that $T$ is a test for mind in animals. Then $T$ is 95 percent sensitive for mind in animals if and only if (in the long run) of every 100 randomly selected animals who actually have minds, the test correctly indicates that 95 of them have minds while incorrectly indicating that 5 of them lack minds (5 false negatives). Ceteris paribus, the higher the sensitivity, the fewer false negatives and thus the better the test. Similarly, a diagnostic test for some feature $F$ in a group $G$ of subjects is said to be $x$ percent specific for $F$ in $G$ if and only if (in the long run) of every 100 randomly selected members of $G$ who do not have $F$, $x$ of them will test negative for $F$ (true negatives) and $100-x$ of them will test positive for $F$ (false positives). For example, suppose again that $T$ is a test for mind in animals. Then $T$ is 87 percent specific for mind in animals if and only if (in the long run) of every 100 randomly selected animals who do not have minds, the test correctly indicates that 87 of them are mindless while incorrectly indicating that 13 of them have minds (13 false positives). Ceteris paribus, the higher the specificity, the fewer false positives and thus the better the test. Ideally, a test for a feature in a group of subjects should be 100 percent sensitive and 100 percent specific, i.e., the percentage of false negatives and false positives generated by the test should be zero in the long run.

Descartes believed that when applied to humanlike organisms and ani-
mals, his Language Test, though admittedly fallible in an absolute sense, was nevertheless 100 percent sensitive and 100 percent specific for mind. That is to say, he thought that the percentage of false positives and false negatives generated by the test was zero in the long run. It is important to note that to generate 0 percent false positives or 0 percent false negatives in the long run is not the same as to generate no false positives or no false negatives whatsoever. For example, the percentage of mind-endowed organisms that fail the Language Test being zero in the long run is compatible with some mind-endowed organisms failing the test. And similarly in the long run, 0 percent of mindless organisms passing the test is compatible with some of them passing the test.

Unlike the Language Test, the Action Test does not come packaged in intuitive and critical versions. There are two versions of the Action Test, but the second is little more than a restatement of the first version, set out in Section II, when applied to animals:

Second Version (Reformulation for Animals) of the Action Test:
It is also a very remarkable thing that, although there are a number of animals that manifest more practical intelligence in some of their actions than we do, one nonetheless observes that in many other actions these same animals manifest no practical intelligence at all, so that what they do better than us does not prove that they partake of mind; for, on this score, they would partake more of mind than any of us does, and so would do better at everything. It proves, rather, that they don’t partake of mind at all, but that it is Nature which acts in them according to the disposition of their organs. Similarly, people recognize that a clock, which is composed only of wheels and springs, can count the hours and measure time more exactly than we can with all our practical wisdom.159

The Action Test envisions an ingeniously fabricated machine that performs many human actions as well as or even better than we humans can. What it rules out is a machine that can act successfully throughout the full range of situations that a human might confront and deal with successfully. This range consists of an unbounded or infinite set of situations. Descartes concedes that a machine could be fabricated to act successfully in a finite number of situations—although when this finite number becomes large, he expressly doubts that a sufficient number of mechanisms could be built into a machine to generate all the needed actions.160 (Griffin makes much the same point when he declares that “[e]nvironmental conditions vary so much that for an animal’s brain to have programmed specifications for optimal behavior in all situations would require an impossibly lengthy instruction book.”)161 What outstrips the capacity of a machine to generate appropriate actions and thus requires a mind is the unbounded or infinite variety of
situations a human might encounter. Consequently, if one finds that a sub-
ject acts successfully in numerous situations that exhibit substantial variety,
one has compelling evidence of a mind at work. This evidence warrants
only moral certainty, but moral certainty so strong as to shade into absolute
certainty.162 But what if such evidence is not forthcoming despite our best
efforts to obtain it? We ought then conclude that the subject fails the Action
Test and so in all probability has no mind, i.e., we may infer with moral cer-
tainty that the creature is mindless. It is possible that a mind-endowed sub-
ject could fail the Action Test by feigning mindlessness, by choosing to fail,
or through an uncommonly long string of uncommonly bad luck, but the
probability of such happenings is remote. And when one considers not just
a single subject but a class of subjects as numerous as animals, the possibil-
ity that they all have minds but for one reason or another fail the Action Test
becomes so improbable as to be downright incredible.

Baker and Morris at times come close to appreciating the holis-
tic/piecemeal distinction that underlies the Action Test. For example, they
write:

Descartes affirmed explicitly that any bodily movement per-
formed by a human being could be performed by a machine or
an animal if it were given an appropriate disposition of its
organs. What a machine cannot do is 'act in all the contingen-
cies of life in the way in which our reason makes us act'.163

and

What is explicitly claimed to distinguish human movements
from animal movements here is their global organization and
plasticity. Hence one might see this passage as turning on a
quantifier-shift: any human movement can be performed by a
machine, but no machine can perform every human movement.
But even this claim cannot be interpreted as an infallible empir-
ical test for distinguishing human beings from mere machines.
It cannot be logically impossible for a machine to pass the
'Turing test'. There can be no limit to the complexity of a
machine which could be created by God, hence the claim can-
not be that it is logically impossible for God to make a machine
capable of performing every movement that human beings can
make.164

If you substitute the word "action" for "movement" throughout the forego-
ing passages, you get an insightful account of the principal idea behind the
Action Test, an idea brought into relief by Descartes's emphasis on abject
failure or mindless floundering.

Descartes clearly believes that when applied to humanlike organisms
and animals, his Action Test, though fallible in an absolute sense, is 100 per-
cent sensitive and 100 percent specific for mind. That is to say, the percent-
age of false positives and of false negatives generated by the test is zero. But we must remember that to generate 0 percent false positives or 0 percent false negatives in the long run is not the same as to generate no false positives or no false negatives whatsoever.

The foregoing analysis makes evident the relationship between the Two Tests. For a subject to pass either test but fail the other is improbable to the point of being incredible but nevertheless possible in Descartes’s absolute sense. The analysis also brings out the methodological superiority of the Language Test. To investigate whether a subject passes or fails the Language Test is a more circumscribed enterprise than investigating whether it passes the Action Test, e.g., the required sampling procedures are much better defined. Gunderson and Wilson were right, therefore, about the superiority of the Language Test. It truly is the superior test for mind, but not because it is more sensitive, more specific, or more certain, but simply because it is more practical.

XI. A NON-CARTESIAN (OLFACTORY) TEST FOR ANIMAL CONSCIOUSNESS

Having devoted so much space to Descartes’s legacy in philosophical ethology in general and to his Two Tests for animal mind in particular, we wish to close by proposing an empirical test for animal consciousness that falls outside the Cartesian framework. Hardly any philosopher pays attention to olfaction, yet it is the source of remarkable phenomena that sometimes enable one to discriminate conscious from unconscious perception. We appeal in this section to recently discovered olfactory phenomena to formulate a test of consciousness for a restricted class of animals. The test we propose is neither a language test nor an action test, nor is it a species of analogical argument. Accordingly, we believe our proposal to be the first proffer of a test for animal consciousness that breaks out of the Cartesian straightjacket. Our olfactory test is not air-tight, of course. A skeptic might plead—however implausibly—that the differential physiological response central to the test is causally mediated by something other than consciousness. Still, we think that our olfactory test creates a strong presumption of consciousness in any species that passes it. Unlike Descartes’s Two Tests, our olfactory test is asymmetrical in the sense that failure to pass it does not imply, even weakly, absence of consciousness.

We turn to the psychologists Piet Vroon and Hans de Vries and to the biologist Anton van Amerongen for a concise account of the relevant phenomena:
Many people turn out to be anosmic for androstenes; for example, almost half the population cannot perceive the smell of androstenone. There are indications that genetic factors may be connected with this inability. Anosmia for androstenone, however, does not mean that there is never a reaction to the odor. It has been shown that the electrical resistance of the skin (the galvanic skin response, or GSR, an indicator, for example, for alertness) can drop sharply after an encounter with androstenone, particularly when the odor is not consciously perceived. This fall is an indication of a general rise in activity in the emotional field, too. If the smell is experienced consciously and is found to be pleasant, such a fall also occurs; if the odor is found to be unpleasant, however, then the GSR does not change perceptibly. These are remarkable phenomena, as they show a difference between the effects of conscious and unconscious perceptions of smell. With unconscious perception the general bodily level of activity increases, but if the perception penetrates consciousness, the reaction then becomes highly dependent on the appreciation of the smell. It follows from this that such a smell can influence the physical and mental condition in various ways, depending on the concentration.

Our olfactory test for consciousness (conscious perception) turns on three of the phenomena reported by Vroon, van Amerongen, and de Vries, namely: (1) that unconscious perception of androstenone causes a sharp GSR drop in humans; (2) that conscious perception of androstenone as pleasant also causes a sharp GSR drop in humans; but (3) that conscious perception of androstenone as unpleasant causes no perceptible GSR change in humans. Our test is applicable only to animal species that exhibit these three phenomena. Whether there are such species is an empirical matter, but it does not seem farfetched to suppose that these same or similar phenomena characterize some of our closest animal kin.

Suppose, then, that comparative psychologists have identified a group of bonobos who are sensitive to the smell of androstenone. Suppose further that some of these bonobos exhibit a sharp GSR drop in the presence of androstenone when their attention is focused elsewhere, and that they also experience a sharp GSR drop when their attention is directed toward odors, which they appear to find pleasant, that emanate from an androstenone source. Suppose, finally, that the other bonobos in the group also exhibit a sharp GSR drop in the presence of androstenone when their attention is focused elsewhere, but that these other bonobos do not exhibit a sharp GSR drop when their attention is directed toward odors that emanate from the androstenone source and which they appear to find unpleasant. We would then have grounds for saying that in the bonobos which do not exhibit a sharp GSR drop when their attention is directed to an androstenone odor which they appear to find unpleasant, consciousness of the unpleasant smell...
is causally responsible for the rough constancy of their GSR. And the fact that these apes are aware of some of their olfactory perceptions means that they are conscious beings. Q.E.D.

Our olfactory test for consciousness is really a schema for a family of tests on many species of animals. Variants of our test might utilize different odor sources, different affects, and different physiological responses to the odors when perceived consciously and when perceived unconsciously. Some variants might even incorporate other sensory modalities. For example, we can envision a gustatory test for canine consciousness along the following lines. Suppose that we humans exhibit some distinctive physiological response to the taste of a certain substance when we consciously perceive the substance as sweet as well as when our gustatory perception of the substance is unconscious. Suppose further that this distinctive physiological response does not occur when we consciously perceive the substance as bitter. We can readily imagine that dogs might resemble us in their physiological and gustatory responses to this substance, thereby affording us another means to determine whether some canine perceptions are conscious.

But does our olfactory test really break the Cartesian mold? It clearly is not a language test or an action test, but is it not at bottom a thinly disguised argument by analogy? We think not. We have given a causal interpretation to the empirical data related by Vroon, van Amerongen, and de Vries. That is to say, we have interpreted the psychological findings in a way that causally discriminates conscious from unconscious perception of smell. We then extended our causal hypothesis to (hypothetical) similar phenomena exhibited by animals. This last move makes no appeal to analogy; it is nothing but garden-variety generalization.

NOTES

2. Ibid., 196.
3. Ibid., 196n. 1.
4. Ibid.
8. Baker and Morris claim that their interpretation of Descartes’s dualism “meets the general criteria for being a good interpretation of the corpus of his texts,” but fail to spell out these criteria. See Gordon Baker and Katherine J. Morris, Descartes’ Dualism (London and New York: Routledge, 1996), 193. However, Baker and Morris do “propose two interpretative principles that are violated not just by the standard critiques of Cartesian
Dualism, but also by the schematic critiques of Descartes' Dualism just adumbrated. The first principle is to attend scrupulously to the modal qualifications that are conspicuous features of Descartes' statements. The second is to reflect sensitively on what he meant by all the terms that occur in his seemingly bizarre doctrines in order to work out the context of his thoughts" (ibid., 201). These injunctions embody sound scholarly advice, but they do not constitute criteria of interpretative adequacy.

11. See Descartes, Meditations on First Philosophy, Second Meditation.
13. Ibid., 140–41 (AT VI: 57–60).
14. Discours de la méthode (AT VI: 56); our translation; words in brackets are always our insertions.
15. Ibid., AT VI: 57.
16. The critical version of the Language Test, along with another version of the Action Test, are discussed in sect. X of this paper.
19. For a detailed illustration of responsible philosophical exegesis, showing how to substantiate Quine's Indeterminacy-of-Translation thesis by proving the clear and precise claim that results from the translation-manual formulation when logically strong choices have been made at the interpretative nodes, see ibid., 319–43.
21. See Quine, Word and Object, chap. 2, passim.
23. AT V: 276; our translation. This passage appears just before Descartes presents a review of his Language Test.
24. More exactly, the one problem is to discriminate true humans from humanlike automatons, and the other is to distinguish animals from humans in a way that makes their fundamental difference [differentia] manifest.
25. The pineal gland or conarium is also known as the pineal body or epiphysis. It is probably an evolutionary vestige of a functional eye and is found in a rudimentary form in all lower vertebrates. In present-day fish, snakes, and amphibians, it is buried below the skin and retains some sensitivity to light but has little visual importance. In humans, it retrogresses and becomes fibrotic at about seven years of age. It is widely thought to be an endocrine gland with some influence on sexuality. See William H. Harris and Judith S. Levey, eds., The New Columbia Encyclopedia (New York & London: Columbia University Press, 1975), 2151. The pineal gland is also thought to be implicated in an organism's biological clock. Ironically, given Descartes's views on the abject failure of dogs to bury their excrement as contrasted with the striking success of clocks at keeping time, the biological clocks of dogs are accurate to within one minute per twenty-four hour cycle. See Bruce Fogle, The Dog's Mind (New York: Howell Book House, Macmillan, 1990), 42–44.
27. Ibid. Williams is right about the uniqueness consideration, but wrong about the alleged false belief. Descartes was quite aware of the presence of a pineal gland in many non-
human animals, even remarking that the pineal gland was larger and more prominent in some animals than in humans (AT III: 49, 143–44). In later writings, Williams avoids this error without acknowledging ever having made it.

29. The need for the probability qualifier will become evident in the next several paragraphs.
30. Passions de l’âme, art. XLIX (AT XI: 367–68); our translation.
33. Ibid., 1: 376–377 (AT XI 431); our italics.
34. Descartes à Morus, 5 février 1649 (Letter of 5 Feb. 1649 to Henry More) (AT V: 276–77); our translation.
35. See Descartes’s explanation of moral certainty in Principles of Philosophy, art. 205 and 206. Briefly put, moral certainty is probability so great as to approach absolute certainty, but without ever reaching it.
36. “It is true that very few people are so weak and irresolute that they choose only what their passion dictates. Most have some determinate judgements which they follow in regulating some of their actions” (Passions of the Soul, art. 49, in The Philosophical Writings of Descartes, trans. Cottingham et al., 1: 347 [AT XI: 367–68].)
37. Roughly speaking, natural movements of the body are those that spring from within as opposed to those caused from without. For example, the uncoordinated motions of a man experiencing a grand mal seizure are natural, while many of contorted motions caused by the forces of impact in an automobile accident are not.
39. Chomsky has himself recognized that Descartes’s views on language were founded on a prior analysis of the limits of mechanical explanation. See Noam Chomsky, Cartesian Linguistics, 3. See also Noam Chomsky, Language and Thought (Wakefield, R.I., and London: Moyer Bell, 1993), 36.
40. The unbounded character of linguistic output is one reason why Chomsky calls his approach to language Cartesian.
41. Passions of the Soul, art. 17, in The Philosophical Writings of Descartes, trans. Cottingham et al., 1: 335 (AT XI: 342).
42. See sect. IX below.
43. See Baker and Morris, Descartes’ Dualism.
44. Quoted by Gunderson, “Descartes, La Mettrie, Language, and Machines,” 213.
45. Ibid., 194.
46. Ibid., 219.
47. Baker and Morris, Descartes’ Dualism, 91. Gunderson, too, flirts with the idea that Descartes took sentience to be mechanically explicable: “Descartes does admit, however, that beasts are capable of a kind of purely mechanical or ‘unconscious’ feeling and sensation. This notion is left unclarified, though he seems to be suggesting that certain reflex movements would perhaps involve feeling or sensations of a sort: a dog would, supposedly, in some mechanical way react to and feel a swift kick but would not, on Descartes’ account, have pain. On the whole I believe Descartes does not argue as effectively for the claim that beasts lack all feeling and consciousness, as he does for the claim that they do not think or reason” (“Descartes, La Mettrie, Language, and Machines,” 202n. 1).
48. Baker and Morris, Descartes’ Dualism, 82.
49. See ibid., 163ff., for their detailed and imaginative account of Descartes’s doctrine about the substantial union of mind and body.
50. Meditations on First Philosophy, Sixth Meditation, in The Philosophical Writings of Descartes, trans. Cottingham et al., 2: 56 (AT VII: 81).
52. Ibid., 180ff.
53. Ibid., 182.
54. Ibid.
56. AT V: 278.
57. AT V: 276; our translation.
61. The original reads as follows: “Cogitationis nomine, intelligo illa omnia, quae nobis consciis in nobis fiunt, quatenus eorum in nobis conscientia est. Atque ita non modo intelligere, velle, imaginari, sed etiam sentire, idem est hic quod cogitare. Nam si dicam, ego video, vel ego ambulo, ergo sum; & hoc intelligam de visione, aut ambulatione, quae corpore peragitur, conclusio non est absolute certa; quia, ut saepe fit in somnis, possum putare me videre, vel ambulare, quamvis oculos non periam, & loco non movear, atque etiam forte, quamvis nullum habeam corpus. Sed si intelligam de ipso sensu sive conscientia videndi aut ambulandi, quia tunc refertur ad mentem, quae sola sentit sive cogitat se videre aut ambulare, est plane certa” (AT VII A: 7–8).
63. Ross has extended his Performative Thesis to sentences with illocutionary forces other than assertional or declarative, e.g., to interrogatives and imperatives. See Davis, *Philosophy and Language*, 127–28.
64. Descartes au Marquis de Newcastle, 23 nov. 1646 (Letter to the Marquess of Newcastle) (AT IV: 576); our translation.
65. Descartes à Monus, 5 février 1649 (Letter to Henry More) (AT V: 276–77); our translation.
66. *Discours de la méthode* (AT VI: 59–60); our translation.
67. Descartes à Morus, 5 février 1649 (Letter to Henry More) (AT V: 278–79); our translation.
68. Ibid. (AT V: 278); our translation.
72. Descartes au Marquis de Newcastle, 23 nov. 1646 (AT IV: 576).
73. Quoted by Gunderson, “Descartes, La Mettrie, Language, and Machines,” 206.
74. Ibid., 194.
75. Ibid., 211.
76. Ibid.
78. Hume's illustration of imperfect analogy in *An Enquiry concerning Human Understanding*, sect. IX, is ambiguous between (1) inference from observed blood circulation in a specimen of a species to its circulation in all conspecifics, and (2) inference from
observed blood circulation in one animal species to its circulation in all sanguineous species. We have opted for the second construction on the grounds that Hume would undoubtedly have regarded the inference from the circulation of the blood in an individual frog to its circulation in all frogs as an instance of perfect analogy.

79. Sponges “show so little movement that until the 18th cent. naturalists considered them plants.” The New Columbia Encyclopedia, 2599. Why, then, did Descartes classify them as animals? We suspect that the aforementioned naturalists were British, and that British natural history lagged behind continental biology in this taxonomical matter. A possible deeper explanation is rooted in the fact that Descartes’s mechanistic account of living creatures expunged any meaningful line between plants and animals, thus leaving him free to classify sponges and other recalcitrant creatures in any way that promoted his philosophical or theological agenda.

80. Le Monde (The World) (AT XI: 130ff.).

81. New Columbia Encyclopedia, 1897.

82. Our terminology is nonstandard but reader-friendly. By a Turing Program we mean the set of instructions commonly labeled a Turing Machine. We call any physical device that implements Turing Programs a Turing Machine. By a Universal Turing Program is meant a Turing Program that in a mathematically precise sense does the work of all Turing Programs (it can mimic each of them). For an elementary exposition of these and related matters, see Gerald J. Massey, “On the Pedagogy of Turing Machines,” The Computers and Philosophy Newsletter (Pittsburgh: Center for Design of Educational Computing, Carnegie Mellon University) 1 (1986): 6–24.


86. Ibid., 472.

87. The common-sense reasoning behind Holmes’s conclusion that the abduction of Silver Blaze was an “inside job” goes back at least as far as Homer. Odysseus, who has just returned home after a twenty-year absence, infers from the failure of the dogs of his swineherd Eumaeos to bark that an approaching person is someone familiar to the dogs; the person turns out to be his son, Telemachos. See Homer, The Odyssey, bk. XVI, ll. 1–10.

88. See Descartes, Meditations on First Philosophy, Fourth Meditation, “Truth and Falsity.”

89. Because our concern is principally with animal minds, we have framed the Natural Impulses Test as a touchstone for discriminating minded from mindless animals rather than true humans from humanlike automatons.

90. Descartes à Mersenne, 18 mars 1630 (Letter to Mersenne) (AT I: 134).

91. Passions de l’âme, art. 50 (AT XI: 368–70).


93. Passions de l’âme, art. 50 (AT XI: 369); our translation.

94. Ibid.

95. Cogitationes Private (AT X: 219); our translation. These notes were written sometime during 1619–21.

96. Descartes au Marquis de Newcastle, 23 nov. 1646 (AT IV: 575); our translation.

97. Radner and Radner, Animal Consciousness, 52.

99. Descartes au Marquis de Newcastle, 23 nov. 1646 (AT IV: 575–76); our translation.
103. Ibid.
104. Descartes au Marquis de Newcastle, 23 nov. 1646 (AT IV: 573).
107. Ibid., 38.
110. Ibid., 94.
111. Ibid. Griffin extends his point to conscious mind generally. By *conscious mind*, he means only awareness, e.g., of objects, perceptions, or sensations.
112. Ibid., 79.
113. Ibid., 73.
114. Ibid., 74.
115. Ibid.
118. Ibid., 207.
119. Ibid., 209.
123. Ibid., 62ff.
124. Sacks, *The Man Who Mistook his Wife*, 8–22. The condition with which Sacks’s musician was afflicted is called visual agnosia.
126. Descartes au Marquis de Newcastle (AT IV: 573); our translation.
127. Darwin supplies an instructive example of how thought degrades action when he comments that the fear responses of “spooked” or “started” horses cover a spectrum from “a mere glance at some unexpected object, with a momentary doubt whether it is dangerous, to a jump so rapid and violent, that the animal probably could not voluntarily whirl round in so rapid a manner” (Darwin, *Expression of the Emotions*, 38). Any experienced horse-handler (one of the present authors included) can corroborate Darwin’s observation.
129. In one sense we do keep time mindlessly, thanks to our biological clocks in which our pineal glands play a significant role, but we can also apply our reason to perform the same task, e.g., by assessing the position of the sun or stars, by counting our heart beats, by building chronometers, etc.
130. An excellent example of animal action superiority well outside the sphere where Descartes believed that we act mindlessly is the management of intraspecies aggression
by hamadryas baboons; see Hans Kummer, *In Quest of the Sacred Baboon*, chap. 4. Similarly, Frans de Waal has suggested that, unlike theoretical intelligence, the political intelligence of chimpanzees might not be inferior to our own; see Frans de Waal, *Chimpanzee Politics*, rev. ed. (Baltimore, Md.: Johns Hopkins University Press, 1998), passim.


132. Ibid., 333.

133. Ibid.

134. Ibid., 335.

135. “Gorillas and chimpanzees may brandish sticks during aggressive encounters, and may occasionally use them as clubs” (*The Oxford Companion to Animal Behaviour*, ed. David McFarland [Oxford and New York: Oxford University Press, 1982], 577). Breaking branches off trees for use as weapons may be minimal weapon making, but it is weapon manufacture nonetheless.


139. Descartes au Marquis de Newcastle, 23 Nov. 1646 (AT IV: 574); our translation.


141. Ibid., 200.

142. Descartes himself speaks of a demarcation with respect to thought [peassée], not with respect to rationality.


144. *Cogitationes privatae* (AT X: 219); our translation and emphasis.


146. AT XI: 369; our translation and emphasis.


148. Ibid. (AT VIIIA: 328). This is a supplementary remark from Picot’s 1647 French edition of the *Principles*.

149. AT VI: 57; our translation and emphasis.

150. AT V: 278.


152. Note that our hypothesis was in fact not antecedently improbable.

153. Gunderson, “Descartes, La Mettrie, Language, and Machines,” 199; the parenthetical material appears in the original.


155. *Discours de la méthode* (AT VI: 56); our translation.

156. Descartes thinks that each response needs its own disposition, i.e., a mechanism dedicated to generating the given response in appropriate circumstances.

157. What is envisioned is something like a modern sampling procedure.

158. Anyone who challenges the conceivability of such a state of affairs must come to terms with the fact that indigenous peoples who live in the habitat of the orangutan—the name itself means “man of the forest”—believe these apes to be human beings who refuse to speak lest they be compelled to work. See Noam Chomsky, *Reflections on Language* (New York: Random House, Pantheon Books, 1975), 40–41.

159. *Discours de la méthode* (AT VI: 58–59); our translation.
160. Again, Descartes thinks that each response requires its own dedicated mechanism.


162. As with the Language Test, a sampling procedure is envisioned.


164. Ibid., 89.