philosophy, physics, anatomy, and biology. He was a strong exponent of experimentation and Cartesianism and a member of the famous Société des Laîcistes.

During 1665–71, Bayle met and worked with Pierre-Sylvain Régis, a student of Jacques Rohault, who was sent from Paris to offer courses on Cartesianism. Bayle’s General Systeme of the Cartesian Philosophy appeared in 1669 and contains the first complete statement of Descartes’ system. It is admirably broad and complete; it includes topics ranging from metaphysics and logic to plants and animals. Of note, given Bayle’s concern with the role of experience in science, is the inclusion of the three grades of sensory response from Descartes’ Sixth Replies (AT VII 436–38, CSM II 291–93) (see sensation).

By 1670, Bayle habitually opened the Cartesian conferences, lecturing on curious medical cases, such as his study of a twenty-five-year pregnancy. He believed that such “freaks of nature” play an important role in the progress of science, piquing the curiosity of the scientist and motivating him to tedious study. With the publication of Dissertations medicinae tres in 1670, Bayle’s work and merit were recognized by the Royal Society of London and the Académie des sciences in Paris.

Bayle’s Discourse on Experience and Reason (Lennon and Easton 1992) carries the subtitle: “In which it is shown the necessity of joining the two in medicine, and in surgery.” Bayle criticizes placing reason above experience and failing to draw on reason to identify causes. He praises Descartes’ genius for identifying causes while cautioning the lack of sufficient observations for conclusions concerning the movement of the heart and the function of the pineal gland.

In addition to his activities as reformer, teacher, scientist, and physician, Bayle served as adviser to the Parliament of Toulouse in 1681 when summoned to examine multiple cases of alleged demonic possession. Against the common superstitions of the townspeople, Bayle offered a naturalistic explanation, which carried the day.

Much of his later writings concerned topics in physics, anatomy, and plants and animals, subjects treated in his most substantial work, the Institutiones (1700–1). He died on September 24, 1709, at his home in Toulouse, at the age of eighty-seven. See also Cartesianism; Experiment; Explanation; Medicine; Régis, Pierre-Sylvain; Rohault, Jacques

FOR FURTHER READING

Primary Sources


Secondary Source


BAYLE, PIERRE (1647–1706)

Born at Le Carla, Bayle studied philosophy at Puylaurens and Toulouse before teaching at the Protestant Academy of Sedan and finally at the École Illustre of Rotterdam. He is best known for his Dictionnaire historique et critique (1st ed., 1697; 2nd ed., 1702) and for several philosophical works: Pensées diverses sur la connaissance (1682) against superstition, Commentaire philosophique (1686–88) on religious tolerance, and Entretiens de Maxime et de Théodice (1707) on the problem of evil (to which Leibniz responded in his Theodicy). Bayle died in Rotterdam.

Cartesian themes run throughout Bayle’s writings, but he devoted only three early works (ca. 1680) explicitly to elements of Descartes’ philosophy: the Dissertation (1664, 4109–31), in which the account of body in terms of res extensa is defended (see extension): the Théories philosophiques (1664–65: 4132–45) on twelve diverse topics; and the Objects (1665, 4146–65) to Pierre Poiret’s 1675 Cogitationes rationales, in which Poiret grounded Christian theology on Cartesian metaphysics. In several articles of his Nouvelles de la république des lettres of 1684–87 (1694, vol. 1), Bayle also engaged in the debate between the Cartesian Malebranche and Arnauld. It is notoriously difficult to discern Bayle’s intentions in these or any of his works, such that it is now common to speak of the “Bayle enigma” (see Lennon 1999). Not surprisingly, then, the literature presents various approaches to understanding the general relationship between Bayle and Cartesianism.

Paganini (2008) argues as follows that Bayle’s skeptical arguments contributed to the demise of Cartesian metaphysics. In remark B of the article “Rimini in the Dictionnaire, Bayle commented on a discussion in the Second Replies. Descartes was informed that the fourteenth-century theologian Gregory of Rimini taught that God could deceive, if only to bring about a good effect. Bayle argued that Descartes’ reply effectively conceded Rimini’s thesis and concluded that Descartes’ metaphysics, relying on absolute divine veracity, was thereby “ruined.” Moreover, in his discussions of the problem of evil (e.g., Dictionnaire, “Machiniciens” and “Pahlicians”), Bayle sought to demonstrate the impossibility of theodicy, thereby undermining Descartes’ Fourth Meditation (see err, theodicies of).
Others emphasize Bayle's debt to Descartes. Labrousse (1963–64) argued that the *Dictionnaire* represents Bayle's transposition of the Cartesian *method of doubt* from metaphysics to the domain of history. While the Cartesian metaphysician accepts only what is clearly and distinctly perceived, the Bayesian historian accepts only what is contained in or derivable from documented evidence. Ryan (2009) provides specific examples of Bayle's debt to Descartes and Malebranche in metaphysics: the ontology of *substance*, the conception of matter as pure extension, *dualism*, and the Malebranchoian distinction between *idees* and sentiments. Against Bayle's self-description as an impartial reporter of debates, Ryan argues that these Cartesian theses represent strong commitments in Bayle's writings. See also Calvinism; Cartesianism; Error, Theodicies of; Malebranche, Nicolas

FOR FURTHER READING

Primary Sources


Secondary Sources


BEAUGRAND, JEAN DE (1595–1640)

Beaupre was both a lawyer and a mathematician. Descartes had contempt for him, saying so in so many words (AT II 255, CSMK 89). Descartes' condemnation was strong, even by his own standards, referring to Beaupre's appeal to living authorities in mathematical matters as testifying to his impudence and effrontery no less than his ignorance, and to his book on "geostatics" as so impertinent, ridiculous, and dearestable as to cause wonder that anyone should have read it (those who did so generally shared Descartes' view, if not his language in expressing it) (AT III 188–89). Indeed, in reaction to a letter of his that Mersemme conveyed after his death, Descartes urged that no more be sent because he already had enough toilet paper, which was the only use for Beaupre's correspondence (AT III 437).

It is not irrelevant to these hard words that Beaupre had accused Descartes of borrowing from Vieno, whose work Beaupre had edited, and Harriot in his *Geometry*, which he had occasion to examine as secretary to the chancellor when Mersemme on Descartes' behalf submitted the *Discours on Method* and accompanying "Essays" for the privilege to publish. Nor is it irrelevant that Beaupre himself was not accused of plagiarism. Accusations of this sort are multiply difficult to deal with, but perhaps the most relevant feature for contemporary readers of Descartes is the perception of Beaupre in the period. Pascal's account (analtered in its basic features by Baillet's later version, which nonetheless differs in some respects) is that Beaupre sent to Galileo unsigned copies of solutions to problems concerning the cycloid by Roberval, Fermat, and Descartes, and did so in such a way as to lead one to think that the solutions were his own. (The imbroglio, on this account, was extended when upon Galileo's death the material was passed to Torricelli.) See also Baillet, Adrien; *Discours on Method*; Fermat, Pierre de; Galilei, Galileo; Mersemme, Marin; Pascal, Blaise; Roberval, Gilles Personne de

FOR FURTHER READING


BEECKMAN, ISAAC (1588–1637)

Beckman was born and raised in the city of Middelburg, capital of the Dutch province of Zeeland, where his father had established himself as a candlemaker. Owing to his father's difficulties with the Reformed Church in Middelburg, Isaac was sent to the Latin schools at nearby Arnemuiden and Veere, before entering Leiden University
SOUL, IMMORTALITY OF THE

The full title of the first edition (1641) of Descartes' most renowned work was *Meditations on First Philosophy in Which the Existence of God and the Immortality of the Soul Are Demonstrated*. On the basis of this title one would expect to find within that text equal effort devoted to proving the immortality of the soul and to proving the existence of God. Yet, while the latter is given abundant treatment in two separate meditations (3 and 5), neither the noun *immortalis*tar nor the adjective *immortale* appears even once in any of the six meditations. Appropriately, the title of the second edition (1642) of the *Meditations* lacked any explicit reference to immortality and promised only to demonstrate, in addition to the existence of God, "the distinction between the human soul and the body."

There is good reason to ask, therefore, at least in the case of the *Meditations*, whether Descartes intended to offer any rational support for belief in the immortality of the soul. A negative response to this question is suggested by epistolaryst evidence that Descartes himself did not choose to mention immortality in the title of the 1641 *Meditations* but that Mersenne was responsible for the inclusion: "I am finally sending you [Mersenne] my work on metaphysics, which I have not yet put a title to, so that I can make you its godfather and leave the baptism to you." (AT III 238-39; GSBK 158; see Fowler 1999, 35-53, for the debate on this authorship). However, it will become clear from texts undeniably penned by Descartes that he intended early in his career to prove the immortality of the soul and that he eventually believed that he had offered the strongest possible demonstration for immortality.

A decade before publishing the *Meditations*, in 1630, Descartes expressed to Mersenne his eagerness to complete a "little treatise of Metaphysics" wherein he "set out principally to prove the existence of God and of our souls when they are separate from the body, from which their immortality follows" (AT 1 181; GSBK 29). Insofar as Descartes is here referring to a metaphysical separation of the soul — its real *distinction* from the body — then this passage is an early indication of Descartes' belief that the immortality of the soul follows from his *dualism*, a point he will raise and develop multiple times in later writings, beginning with the *Discourse on Method*.

In *Discourse V* (1677), Descartes gives a mechanistic account of several functions of the human body, thereby likening humans to both animals and automata, but then he distinguishes humans from the latter two through the use of *language* and the greater range of activities humans can perform. Descartes concludes the discussion by relating it to immortality:

> When we know how much the beasts differ from us, we understand much better the arguments which prove that our soul is of a nature entirely independent of the body, and consequently that it is not bound to die with it. And since we cannot see any other *causes* which destroy the soul, we are naturally led to conclude that it is immortal. (AT VI 59-60, GSBK 141)

Because human life cannot be reduced to the sum of the *motions* of the human body in the same way that (perhaps) animal life can be, human beings have reason to hope that the end of their bodily life does not spell the end of the soul's life.

In November 1649, Descartes sent the manuscript of the *Meditations to Mersenne* along with a Dedicatory Letter to the Sorbonne. At the outset of the dedication, Descartes remarks that "God and soul [animal]" are topics for which *philosophy* ought to offer *demonstrative* proofs; that faith suffices for believers to accept immortality, but that unbelievers require rational arguments for immortality before they will accept it and before they can be motivated to act morally (see *faith, religious*). Descartes expresses his intention to satisfy the 1513 Lateran Council's injunction on Christian philosophers to refute arguments that conclude that the soul dies with the body and to prove the contrary thesis. However, toward the end of the dedication, when Descartes lists the propositions that he can prove in the *Meditations* with "such a pitch of clarity that they are fit to be regarded as very exact demonstrations,"
God exists and that the mind (mens) is distinct from the body" (AT VII 5–6, CSM II 6; see Fowler 1999, 161–75, for "mind" versus "soul" in Descartes' discussions of immortality).

Mersenne was evidently disappointed with the Meditation's treatment of immortality, for Descartes wrote to him on Christmas Eve, 1640:

You say that I have not said a word about the immortality of the soul. You should not be surprised. I could not prove that God could not annihilate the soul, but only that it is by nature entirely distinct from the body, and consequently it is not bound by nature to die with it. This is all that is required as a foundation for religion, and is all that I had any intention of proving. (AT III 266, CSMK 163)

To clear up any future misunderstanding of his intentions regarding this subject, Descartes promised Mersenne to write a Synopsis that would preface the Meditation. This short piece is the most substantial Cartesian text treating immortality.

The Synopsis (AT VII 12–16, CSM II 9–11) outlines the steps required for a rigorous demonstration of the immortality of the soul and separates the premises that are established in the Meditation from those that must await the development of the "whole of physics" (a reference to his later Principles of Philosophy). Those elements of the proof to be found in the Meditation are: (1) "a concept of soul which is as clear as possible and is also quite distinct from every concept of body," (2) a demonstration "that everything that we clearly and distinctly understand is true in a way which corresponds exactly to our understanding of it," (3) "a distinct concept of corporeal nature," (4) a conclusion based on (1)–(3) "that all the things that we clearly and distinctly conceive of as different substances ... are in fact substances which are really distinct" (Descartes gives another argument for [4], independent of [1]–[3], based on the divisibility of matter and the indivisibility of mind, which show that these substances are "in some way opposite"). On the basis of these four points, aptly treated in the Meditation, Descartes believes he has rigorously demonstrated "that the decay of the body does not imply the destruction of the mind," which in his view is "enough to give mortals the hope of an afterlife." But to extend this conclusion to the guarantee of an afterlife for the mind, Descartes candidly admits that two more premises are needed about which he has said nothing in the Meditation.

The two missing premises are (5) "that absolutely all substances ... are by their nature incorruptible and cannot ever cease to exist unless they are reduced to nothingness by God's denying his concurrence"; and (6) that the human body easily decays, but the mind is "a pure substance" and thus is "immortal by its very nature." While the Meditation could establish the possibility that the mind could outlive God could destroy the mind (or body taken generally) and that nothing internal to the soul would ever lead to its decay. The term "pure substance" here has been the subject of debate. Prendergast (1993, 34–35) interprets the term to mark a distinction in kinds of substances, the mind being the only "pure substance." Fowler (1999, 276–300) argues that the distinction Descartes wishes to draw is not between mind and body taken generally but between mind and particular bodies, especially those of humans. Any particular human body has an essence that is constituted by the arrangements of its parts and therefore changes every time those accidents change; while the human mind, on the other hand, remains identical while its individual mental events change. The human body, therefore, is not immortal because its configuration, which is its essence, can easily change; but body taken generally – that is, the whole of res extensa – of which the human body is a part, may also be considered immortal, as Descartes effectively states in premise (5). Purity, therefore, does not restrict immortality to minds.

Four of the six sets of objections (all but the first and third) appended to the first edition of the Meditation raise the issue of immortality. Again, Mersenne was Descartes' staunchest critic. He pointed out that Descartes did nothing to rule out the possibility that God gave the soul only enough life to last the duration of the body's existence. Descartes responded that God was absolutely free to destroy the soul and said, concerning whether or not he would do so, that "it is for God alone to give the answer" (AT VII 154, CSMII 120). The literature on this topic is uniform in claiming that Descartes here offered faith as the only possible foundation for belief that God would grant the soul an afterlife.

Despite his promise, Descartes does not extensively develop premise (5) or (6) outlined in the Synopsis in the later Principles. There is an elaboration on substance, but it is shown neither that all substances are incorruptible from without nor that they are internally pure in the way Descartes described them. Fowler (1999, 240) suggests that Descartes could not say more because of the dangerous theological implications of his view of substance. Perhaps Descartes simply believed that immortality, as opposed to the real distinction, was ultimately a matter for faith and not reason.

An alternative to the common claim that faith, and not reason, ultimately lies at the foundation of Descartes' proof of immortality is that Descartes established that foundation with moral certainty, which is less than the certainty of geometry but is still within the realm of reason distinguished from faith (Hickson 2011; Ritter 1998, 133–45). Descartes responded to Mersenne, recalling a letter discussed earlier, that "we do not have any convincing evidence or precedent to suggest that any substance can perish" (AT VII 153, CSMII 109). For Descartes, a claim can enjoy moral certainty even if the absolute power of God might render that claim false; all that is required for moral certainty is that the claim be established with enough certainty.
for a given practical purpose (AT VIII 327, CSM I 389–90). And as we have seen, Descartes believed his proof was sufficient for the purposes of grounding religion and morality.

See also Certainty, Distinction (Real, Modal, and Rational); Faith, Religious; God; Human Being: Mind; Reason; Substance

FOR FURTHER READING

MICHAEL HICKSON

SPECIES, INTENTIONAL

In the Dioptrics, Descartes remarks that his theory of the instantaneous mechanical transmission of light will deliver "your spirit from all those tiny images fitting through the air, called intentional species, that so much exercise the imagination of philosophers (AT VI 85, CSM I 153–54). In this and other passages where he uses "intentional species," the tone is invariably ironic, even disdainful, and mentioning them serves as foil to his own conception of how the things of the world communicate their presence to the senses.

Intentional species was a topic in Western medieval Scholasticism that produced a family of theories and interpretations operating within a complex of empirical and theoretical concerns. How, within the limits of Aristotelian metaphysics, physics, and psychology, does the sensation of material things and their properties occur, and how does sensation prepare the intellectual apprehension of them? The paradigm example was visual, the perception of color. For Aristotle color is the proper object, the proper sensible, of the visual sense; it is accessible in principle to any animals with eyes. How does this quality of real-world things come to be in sensation? Aristotle, in common with most thought not all ancient theorists, thought that the effect proceeded from the thing to a more or less passively receptive eye. His physics of actuality and potentiality conceived four conditions needing to be fulfilled so that vision might occur: (1) a potentially visible material thing; (2) an eye (in a living, awake animal) with the potential for seeing; (3) a transparent medium between thing and eye; and (4) light. Light, rather than reflecting off the object and traveling to the eye, activates the medium's transparency so that it allows the active color quality in the physical thing to be communicated through the medium to the eye; in the eye, the communicated quality produces the same activity that exists in the physical object, though without that object's matter. This activation is seeing proper.

The spareness of Aristotle's explanation led Western Scholastic thinkers, beginning in the thirteenth century and extending into the seventeenth, to explore the concept further, with assistance from theories and concepts worked out by Islamic Aristotelianism. Intentional species was the term they coined to bring these efforts to a focus. "Species" indicated an appearing form; "intentional" had the dual indication of the process of an effect from natural source to destination, and the subsequent direction of a mind aware of the species back to the natural source. Thus, the intentional species was a psychophysical reality, and the process of transmission from object to eye was physical without the species being a physical substance. The ways in which philosophers parsed the meaning of this were so various that it is impossible to characterize simply the kind of physical reality the intentional species had. They were not, however, despite Descartes' characterization, things (or even images, though that is more arguable) that floated about.

Intentional species also played a crucial role in Scholastic interpretations of how sensory experience leads to intellection — since, as the medieval version of another Aristotelian dictum put it, whatever is in intellect was originally in sense. The sensible form borne by the intentional species worked itself into the phantasms of common sense, memory, and imagination, and in that worked-up form it made possible intellectual abstraction of an intelligible species from the phantasm. Intentional species were also implicated in the medieval optical theory known as perspectivism (see Smith 1987, esp. 32–56). Perspectivism, like most premodern theories of optics, aimed to explain vision, and it did this by offering a theory of the specific rays propagated from physical objects that were properly effective in the eye. Perspectivism could further be interpreted as explaining the physical basis of the transmission and effect of intentional species. Perspectivism, in turn, had a larger metaphysical inspiration from a Platonist metaphysics of light (as developed, e.g., by Robert Grosseteste), which understood physical reality as due to lightlike emanations from higher to lower levels of being.

Borrowing concepts from philosophy of science, one might say that the intentional species represents an ad hoc attempt to shore up a degenerate program of Aristotelian philosophy. It existed uneasily at the crossroads of many different scientific, mathematical, and philosophical disciplines and was aimed more at resolving problems in Aristotelian philosophy than at understanding and explaining natural phenomena. Once Aristotelianism was rejected, the intentional species no longer