to see its influence diminish. Its ahistorical approach to the study of literature was faulted for depoliticizing literature and, thereby, upholding a political status quo. With increased interest paid to Marxist, hermeneutic, structuralist, and feminist criticism in the 1960s, New Criticism ceded ground to a variety of theoretical and historicist concerns. While in the early twenty-first century the New Criticism is faulted for its limitation of focus and methodological austerity, the impact it has had on the rise of a discipline of literary studies in the United States and that discipline's underlying reliance upon various methods of "close" reading are lasting achievements.

See also ***Literary Criticism; Literary History; Literature.***

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NEW HISTORICISM. *See* **Literary Criticism; Literary History.**

NEWTONIANISM. A standard definition of *Newtonianism* or *Newtonian philosophy* found in early eighteenth-century dictionaries such as John Harris's *Lexicon Technicum* (5th ed., 1736) is: "The doctrine of the universe, and particularly of the heavenly bodies; their laws, affections, etc., as delivered by Sir Isaac Newton." An almost identical definition appears around thirty years later in the *Encyclopédie* of Denis Diderot and Jean le Rond d'Alembert: "Newtonianisme ou philosophie Newtonienne: c'est la théorie du méchanisme de l'univers, & particulierement du mouvement des corps célestes, de leur lois, de leur propriétés, telle qu'elle a été enseignée par M. Newton" (Newtonianism or Newtonian philosophy: the theory of the mechanism of the universe, and particularly of the motion of the heavenly bodies, of their laws, their properties, as delivered by Mr. Newton).

The authority of Newtonian philosophy was established through the publication of the two major works of Sir Isaac Newton (1642–1727) in natural philosophy, *The Principia* (*Philosophiae Naturalis Principia Mathematica,* 1687) and the *Opticks* (*Opticks; or, A Treatise of the Reflections, Refractions, Inflections & Colours of Light,* 1704). The former was a work in rational mechanics where Newton aimed to study "the motion that results from any force whatever and of the forces that are required for any motion whatever." His major stake was to overcome the model of impact that dominated the mechanical philosophy of his time and to introduce the notion of attractive force as a proper dynamic factor of motion. Accordingly, he aimed to explain Kepler's laws through the use of universal attraction and to discard the Cartesian theory of vortices. The latter work was a study in the spirit of mechanical philosophy, where Newton investigated the phenomena of light. He introduced his experimental method and he elaborated the atomistic model of matter. In the successive editions of the work he enriched it with a number of "queries" where he developed his theoretical and metaphysical contemplations about the nature of matter, the various instances of attractive and repulsive force, and the theoretical grounding of experimental induction.

The publication of the *Principia* clearly marked the establishment of a new spirit in European natural philosophy. It is equally clear, though, that Newton's contemporaries differed significantly in the appreciation of his magnum opus. Followers like Edmond Halley (1656–1742) and Voltaire (1694–1778) were so excited by Newton's achievements that they placed him in the highest position of the philosophical firmament of the time. At the same time, however, Christiaan Huygens (1629–1695) was astonished by the fact that such an elaborate synthesis in mechanics was founded upon the notorious notion of universal attraction. Along a similar line, Gottfried Wilhelm Leibniz (1646–1716) accused Newton of turning the entire operation of Nature into a perpetual miracle. Having been nourished by the Cartesian rationalistic tradition, Huygens and Leibniz found that the adoption of attraction by natural philosophers would bring about a reversion to the "occult qualities" of Scholasticism.

Historians assume that the *Principia* is one of the least read documents in the history of ideas. Even in the early eighteenth century influential philosophers like John Locke (1632–1704) and Voltaire adopted its message without having read or understood its technical part. The reputation of the *Principia* was based primarily on the authority of very few competent readers. At the same time, quite a few nonmathematical philosophers made a systematic attempt to bring Newton's message to the general reader. To this purpose, they proceeded with the compilation of comprehensive treatises where they presented an outline of Newtonian mechanics and experimental philosophy.

The *Opticks* was a far more widely read work. A reason for this was its deceptive accessibility. The *Opticks* was not a revolutionary work in the sense the *Principia* was. It was rather a brilliant display of the art of experimentation, and it was often cited as a model of how to approach a difficult problem by experiment and how to conduct precise quantitative experiments. What was important in the *Opticks* from the point of view of the Newtonian synthesis was that Newton elaborated there the most comprehensive public statement he ever made of his experimental method:

> As in Mathematics, so in Natural Philosophy, the Investigation of difficult Things by the Method of Analysis, ought ever to precede the Method of Composition

> [or Synthesis]. This Analysis consists in making Experiments and Observations, and in drawing general Conclusions from them by Induction, and admitting of no Objections against the conclusions, but such as are taken from Experiments, or other certain Truths. For Hypotheses are not to be regarded in experimental philosophy. . . . By this way of Analysis we may proceed from Compounds to Ingredients, and from Motions to the Forces producing them; and in general from Effects to their Causes, and from Particular Causes to more general ones, till the Argument end in the most general. (*Optics,* 1979, p. 404)

Newtonianism, however, is much more than the direct impact of Newton's two major works on European intellectual life. First of all, Newtonian philosophy was neither a given system nor a definitive synthesis in natural philosophy. It was rather a multifaceted current shaped by the interpretations of Newton's works and, to a significant degree, by the adaptations of these works to various intellectual environments all over the European continent. Moreover, throughout the eighteenth century "Newtonianism" meant much more than a physical theory. It was an amalgam of scientific, political, and religious ideas, which only partially went back to Newton's original works. It was quite common for people who endorsed Newtonian philosophy to have only a vague idea of his mathematical and experimental investigations. Nevertheless, Newton became something of an authority people drew upon in order to resolve matters concerning not only nature's interpretation but also the conduct of man, the function of the state, and the doctrines of religion. Thus, in what follows we will briefly examine the many aspects of Newtonianism in a variety of intellectual contexts that assigned an accordingly variable meaning to the term.

The author of the aforementioned article in the *Encyclopédie* was Jean Le Rond d'Alembert. Being one of the protagonists in the developments that took place in the field of Newtonian natural philosophy in the mid-eighteenth century, he was well aware of the inadequacy of a general definition of Newtonianism. Hence, after the short descriptive definition he gave in the opening of the article, he immediately proceeded with the delineation of a broad spectrum of notions and practices that contributed to the formation of this intellectual current. Some authors, he notes, perceive Newtonian philosophy as a version of "corpuscular philosophy," enriched and corrected by the discoveries of Newton. In this sense, Newtonian philosophy is nothing else than a new philosophy, distinct from the Cartesian, the peripatetic, and the other ancient philosophies of the body. Others perceive Newtonian philosophy as the method Newton employs in his philosophy. This method consists in deriving conclusions directly from the phenomena, without feigning hypotheses, in starting from simple principles, in deducing the primary laws of nature from a small number of selected phenomena, and in using these laws in order to explain all the other natural effects. In this sense, Newtonian philosophy is nothing else than "experimental physics," opposing to the ancient philosophy of the body. Others perceive Newtonian philosophy as the branch of philosophy that examines natural bodies mathematically and applies geometry and mechanics in the resolution of the respective problems. In this sense, Newtonian philosophy is nothing else than "mechanical and mathematical philosophy." It is clear, thus, that for d'Alembert and his contemporaries, even in the narrow field of natural philosophy Newtonianism means at least three different things: a new philosophy of body, experimental philosophy, and rational mechanics. In fact, all these philosophical and mathematical traditions have a bearing on Newton's own work and mark the distinctive research and philosophical directions that stem from the various pieces of the Newtonian synthesis.

The Philosophy of Body

The "philosophy of body" was deemed a crucial branch of philosophy in the eighteenth century dealing with the nature of matter. According to the traditional Cartesian view, the only essential property of a material body was extension. Figure, position, and motion were only "modes of existence" of an extended being. As a result, all natural effects should be processed on the basis of changes that occur in the shape, the relative positioning, and the motion of the bodies or of their parts. A significant advantage of this approach, according to the proponents of Cartesian philosophy, was that it made clear the distinction between the material agent of natural phenomena and the external cum immaterial causes of motion. This way it was made possible to disengage material bodies from the notorious "occult qualities" they inherited from Renaissance and some aspects of ancient philosophy.

Newtonianism brought about two important transformations to this view: Firstly, it maintained the implicitly theological idea that it is in principle impossible for people to grasp all the qualities of natural bodies. Thus, not only is extension not a unique essential quality of material bodies, but also the few other qualities we are able to know are but a subtotal of the qualities God may have provided the bodies with. Almost all the followers of Newtonian philosophy subscribed to this voluntaristic view of the divine design. Voltaire, Willem Jacob 'sGravesande (1688–1742), and Petrus van Musschenbroek (1692–1761)—to mention only the most active of them—insisted on the constitutional inability of human beings to penetrate God's will so as to acquire a definitive knowledge of the nature of material bodies.

The second transformation has to do with a new addition to the list of attributes of natural body, namely the force of attraction. According to the definition of Musschenbroek,

> those things which we find to be in all bodies, we call their attributes. . . . Among these attributes there are some, which can never be intended or remitted, and others, which are capable of intension and remission. The former are extension, solidity, inactivity, mobility, a capacity of being at rest or having a figure. The latter are gravity and the power of attraction. (Musschenbroek, p. 10)

It is true that in the course of time, this addition gave much trouble to the proponents of Newtonian philosophy. Even in

the early eighteenth century, it was not clear whether attraction was an inherent active principle of the matter, or a force transmitted through an ethereal substance filling the whole universe. As a result, the supporters of this view were accused of reverting to the "occult qualities," which had been banished from philosophy thanks to Cartesian philosophy. Concerning this issue, the Newtonians attempted to articulate a moderate philosophical thesis maintaining that attraction was simply a force of unknown origin that dominated the interactions between material bodies:

> And lest any one should think, because we do not assign the Cause of the abovemention'd attracting and repelling Forces, that they too are to be reckon'd among the Occult Qualities: We shall say, with the great Newton, we do not consider those Principles, as Occult Qualities, which are imagin'd to arise from the specifick Forms of Things; but as the universal Laws of Nature, by which Things themselves are form'd; for the Phaenomena of Nature shew us, that such Principles do really exist, tho' no one hath explain'd yet what are the Causes of them. ('sGravesande, p. 24)

Concerning the idea that attraction might be an inherent quality of matter, however, things were more troublesome. Such an interpretation of Newtonian dynamics by some supporters of Spinozistic philosophy, like John Toland (1670–1722), favored materialism, which was much repudiated by the "orthodox" Newtonians, as we shall see below.

Experimental Philosophy

The second field where the contribution of Newtonian philosophy was considered decisive was "experimental philosophy." Newton applied two new principles in this field. Both of them were an outcome of the aforementioned methodological approach he developed in the *Opticks* and the accompanying "queries."

The first principle was that the only safe way to derive natural laws from the phenomena is to proceed inductively. Hypotheses have no place in this process. Moreover, sticking to this methodological commitment is the only way to protect ourselves from producing natural interpretations built upon "chimerical" suppositions, as was actually the case with Cartesian natural philosophy. "Analysis" (or resolution), as opposed to "Synthesis" (or composition), comprised the core of this method. According to extreme advocates of analytical method, like Abbé Étienne Bonnot de Condillac (1714–1780), analysis was the only correct method of reasoning, because it was taught to humans by nature herself. As a result, even composition would lose its significance: The demonstration of every proposition ought to go over the path of discovery; and the only due method to do so was analysis, not synthesis. It is true that the pronouncement of analytical method has been the source of much confusion, since it has been read by many Newtonians and, evidently, by Newton himself, as if it applies equally to mathematics and to experimental philosophy. On the other hand, however, this same aspect of Newtonian philosophy epitomized the anti-Cartesian stance of many eighteenth-century scholars and became a cornerstone of the natural theology of the time.

The second element Newton introduced to his contemporary experimental philosophy was the quantitative principle. Some fifty years after the first edition of the *Opticks,* d'Alembert described experiments as processes that aim at intentionally producing new phenomena in order to force nature to disclose her hidden principles. The man who had brought experimental philosophy to its current state was Newton. He had done so by introducing geometry into physics and by unifying experimental practice with mathematical techniques. Thus, he achieved an exact, scrupulous, and innovative science. The object of this science was the study of the general qualities of bodies; observation might help us perceive these properties superficially, but only experiment could bring them forth in a precise and measurable manner. The outcome of this process was the formulation of general quantitative laws, especially for those natural phenomena that were perpetually repeated without making evident their causes or the principles that governed their succession. This same perception, however, was also the limit of Newtonian experimental philosophy: Although Newtonian method was considered the key to unlocking the secrets of nature, from the moment the fundamental laws had become known—as most philosophers believed, in the mid-eighteenth century—the usefulness of experimental physics was rendered limited. Any further investigation of natural effects should come under the field of "mathematical sciences," that is, rational mechanics.

Rational Mechanics

Rational mechanics was, indeed, the third field where the Newtonian legacy was of major importance. In the seventeenth century, the term *mechanics* had a double meaning. In his preface to the *Principia,* Newton made a clear-cut dichotomy between "practical mechanics" and "rational mechanics." The former referred to all manual arts people used to practice in varying degrees of exactness. Practical mechanics was closely related to geometry, for geometry "is nothing other than that part of universal mechanics which reduces the art of measuring to exact propositions and demonstrations." However, this was not the kind of mechanics Newton wanted to deal with. "Since the manual arts are applied especially to making bodies move, geometry is commonly used in reference to magnitude, and mechanics in reference to motion. In this sense, rational mechanics will be the science, expressed in exact propositions and demonstrations, of the motions that result from any forces whatever and of the forces that are required for any motions whatever" (Cohen and Whitman, p. 382). Half a century after the publication of the *Principia,* rational mechanics was a well-established branch of Newtonian physics, clearly distinguished from other aspects of natural investigation. A standard definition of the term implied three significant features:

- Rational mechanics was the mathematical study of motions generated from specific forces as distinguished from statics, which examined the forces of a system being in equilibrium.
- The mathematical analysis employed in rational mechanics should be able to represent the generation of

the trajectories of moving bodies as distinguished from geometry, which sufficed only for the description of static curves.

- The current formulation of rational mechanics was based on the *Principia,* as opposed to practical mechanics, which originated in classical and Hellenistic antiquity.

The major contribution of Newton to the establishment of modern rational mechanics was threefold. First, he introduced the notion of attractive force as a dynamic factor of motion. He did so by mathematically constructing the modus operandi of a centripetal force acting as the inverse square of distance; subsequently, he assigned it a natural status by unifying terrestrial and celestial physics on the basis of attraction. His second contribution was that he clearly showed the limits of Euclidean geometry as far as the problems of motion were concerned. Although he himself did not totally reject Euclidean geometry when he composed the *Principia,* the modification of traditional geometry he suggested there, as well as his mathematical studies on "fluxions" and "fluents," indicated that the only proper mathematical way to treat the problems of motion was infinitesimal calculus. His third contribution was the comprehensive study of celestial mechanics and the explanation of a wide range of celestial phenomena on the basis of universal attraction.

Although the last contribution established Newton as a heroic figure throughout the eighteenth century, the two former did not have an equally straightforward effect on his philosophical profile. There is no doubt that Newtonian mechanics bridged the gap between astronomy and cosmology by presenting a concise physico-mathematical model for the operation of the Keplerian laws. However, the mathematical and ontological foundations of Newton's synthesis became the object of much discussion on the part of his successors. It is somewhat ironic that the transcription of Newtonian mechanics in the language of infinitesimal calculus was carried out on the basis of the mathematical notation suggested by Leibnitz, his major philosophical opponent. In fact, it was characteristic of Newtonian mechanics throughout the eighteenth century that many of the people who undertook the further advancement of Newtonian achievements combined the legacy of the *Principia* with the philosophical and mathematical ideas of Leibniz. The incorporation of the vis viva, or living force, theory in many Newtonian treatises that circulated widely on the Continent, along with various attempts aiming to render the laws of motion compatible with the metaphysical principles of Leibniz, were two other instances of this characteristic.

The thorn of Newtonianism, however, was the ontological status of attractive force. Thus, by the mid-eighteenth century quite a few significant mathematicians, like d'Alembert and Lazare Carnot (1753–1823), insisted that the notion of force should be expelled from mechanics. Others, like Johann Bernoulli (1667–1748) and Leonard Euler (1707–1783), suggested that a dynamic factor was, indeed, necessary in mechanics, but they also tried to keep a distance from the metaphysical consequences of such an assumption. In any case, the major pursuit of the time was the transformation of the Newtonian mechanics so that it might work exclusively on the basis of kinetic laws. This process culminated with the publication in 1788 of *Méchanique analytique.* Joseph Louis Lagrange's (1736–1813) work was entirely analytical in contrast to the method employed by Newton in the *Principia,* which was entirely geometrical. Lagrange was an admirer of Newton but he was also a disciple of d'Alembert. Thus, he shared with the latter the desire to develop a new science of mechanics that would not need the metaphysically laden concept of force. As a result, his *Méchanique analytique* drew upon d'Alembert's principle, the conservation of vis viva, and the principle of least action, none of which had a counterpart in Newton's work. Additionally, he applied his method to constrained systems of masses, rigid bodies, and continuous media, which was again a substantial departure from Newton's preoccupation with the legitimization of centripetal force acting at a distance.

Religion and Politics

Newton was not only a natural philosopher and Newtonianism was not only a scientific theory. Newton was also a pious Christian and an active theologian. Newtonianism, on the other hand, besides its scientific content or because of it, was gradually identified with the rise of a Whig oligarchy and with the new balance of power that resulted from the Revolution of 1687–1689 in England. Thus, soon after the publication of Newton's two major works, Newtonianism became the cornerstone of a new intellectual program that affected significantly the political and theological trends of the time. The people who set out this program in England were Newton's friends and supporters, including Richard Bentley, Samuel Clarke, William Whiston, John Harris, William Derham, and Jean Desaguliers. They actively propagandized the idea that Newton's intellectual achievements provided a perfect model for social order, political harmony, and liberal but orthodox Christianity. Although the promotion of this aspect of Newtonianism employed the technical achievements of Newtonian natural philosophy, the discourse built on this basis was not technical in itself. It was primarily through the Boyle lectures (a series of lectures established in Robert Boyle's will to defend Christian orthodoxy against the various forms of atheism) that Newton's followers unfolded the ideological implications of Newtonian science and turned it into a component of moderate Enlightenment.

One major problem with Newtonian philosophy was that it was used by both freethinkers and its religious-minded supporters. The former adopted the mathematical and experimental method as a clue that provided a liberal spirit in the investigation of the natural world; the latter, in addition to this, championed the moral and metaphysical implications of Newton's thought to wage war against pure rationalists and the various representatives of "irreligious pluralism." The other major problem, however, was that in the course of this confrontation, the Newtonian philosophy gave rise to a "heretic" approach to Christian theology, which was much denounced by the official Anglican Church.

Freethinkers and materialists of the time picked up those elements of Newtonian philosophy that fitted their perception

of nature. The doctrine of universal gravity was of prominent importance to this process of adaptation. People with a preference for Spinozistic philosophy, like John Toland, gladly adopted this principle, but they suggested that one should perceive gravity as inherent to matter. Thus, in the hands of freethinkers, the power of gravity provided another evidence that matter is inherently active and offered further support to a purely naturalistic explanation of the universe, devoid of supernatural agencies and occult qualities.

In this atmosphere, even Newton himself was credited with potential atheism. Quite a few Christian thinkers held him responsible for the "misinterpretations" of his theories that resulted in the rejection of divine providence. They cautioned that despite the obvious usefulness of modern science, one should not confuse human knowledge with absolute truth, since the latter becomes known only through revelation. Other thinkers, however, believed not only that Newton's achievements were in accordance to Christian faith, but also that if the new theories were seen in their proper perspective, they would enhance the belief in a universe created and governed by God. Thus, Samuel Clarke (1675–1729), in order to fight Toland's views on the inherently active character of matter, drew upon Newton's argument about the reality of empty space. In his Boyle lectures of 1704 he argued that according to Newton's own demonstration, the existence of a void space is a necessary consequence of the existence of gravitation. And this void space is, of course, the most clear demonstration that the existence of matter is not necessary.

Clarke's belief in the existence of an empty space turned out to be decisive to his metaphysical investigations. This belief was firmly based on the notions of absolute space and time introduced by Newton in the scholium to Definition VIII of the *Principia.* Newton had stressed that only absolute space and time are real and Clarke extended this thought by stating that they are "affections which belong, and in the order of our Thoughts are antecedently necessary, to the Existence of all Things." Space was not a substance in its own right, but from the fact that it is necessarily existent, Clarke inferred that it must be a property of God. This conclusion provided a decisive argument for the necessity of a universal self-existent Being whose attributes are eternity, infinity, and unity. Clarke was well aware, however, that at the theological level there was a potential conflict between the doctrine of Trinity and the view of God's unity that ensued from the notion of absolute space. Although his initial intention was to fight Toland's idea that both God and matter could be considered self-existent principles, in the course of the debate he came to entertain serious doubts about the validity of the doctrine of Trinity. Thus, what initially was an argument against materialism led him to a radical reinterpretation of the Bible in favor of Divine unity. By 1711, in the third edition of his Boyle lectures, Clarke had made this interpretation quite explicit, and one year later he culminated his scriptural investigations with the publication of the *Scripture-Doctrine of the Trinity.* The outcome of his analysis confirmed the distinction between the attributes of God and those of the Son; the former belonged to the eternal being and thus were absolute, whereas the latter belonged to a product of the divine will, and therefore were relative.

Newtonian philosophy found itself in the basis of the heterodox theology suggested by Clarke. It is now well-known that Newton himself was also an anti-Trinitarian. William Whiston, another disciple of Newton, publicly supported the same belief at the expense of his academic career. In the uncertain atmosphere of postrevolutionary England, all these manifestations of heterodoxy could not escape the attention of those who defended religious "orthodoxy" and a certain aspect of social order. As a result, Newtonianism was engaged in the political debate of the time. The degree to which the basic concepts of the Newtonian natural philosophy became acceptable by various groups of English society depended on the political and religious affiliations of these groups. The fact that Newtonianism might be viewed as a faction in philosophy caused a major discomfort to those who held "Tory sensibilities." Political factionalism of the seventeenth century was deemed one of the factors that subverted the political basis of the Stuart monarchy. In this sense, the Newtonian philosophy represented much more than a new trend in the investigation of nature: for a significant part of the English society it symbolized potential social disorder, and Newton was largely held responsible for this. Therefore, words like *attraction* and *inertia,* as well as methodological commitments like experimentalism and the mathematical representation of nature, became part of a polemic.

This was not the case with another aspect of Newtonianism that prevailed on the Continent during the eighteenth century, namely Voltaire's Newtonianism. It took nearly fifty years for the Newtonian worldview to find its first devoted advocates in France. Pierre Louis Moreau de Maupertuis (1698–1759) was the first who pleaded with his countrymen not to dismiss unwisely the exegetical power of attraction. Subsequently, Voltaire, convinced by Maupertuis's assurance about the worth of Newton's synthesis, launched a systematic attempt to familiarize the French educated public with the new natural philosophy. Inevitably, the propaganda for the Newtonian system had to go hand in hand with the undermining of the Cartesian tradition. The French public recognized numerous defects in Descartes's natural philosophy but they believed that an advancement in philosophy would correct these errors and restore the primacy of Cartesian tradition; under no circumstances were they willing to cure Descartes's deficiencies by replacing his philosophy with the Newtonian synthesis. Voltaire dated the beginnings of the decline of the "chimerical philosophy" of Descartes in France to 1730. The main objective of his own attack was to secure Newton's primacy on the basis of the superiority of his analytical method: Newton was superior to Descartes because his discoveries were a product of a systematic inductive investigation of nature confirmed by geometry. Newton never mistook conjectures for truth as was, in fact, the case with Descartes.

An equally important aspect of Voltaire's undertaking was related to the theological dimension of Newtonian philosophy. Quite unexpectedly, Voltaire proclaimed the superiority of Newtonian theology over the Cartesian conception of God, whose "rational" character might seem, at first glance, more appropriate to the atmosphere of the rational Enlightenment. What basically annoyed Voltaire was the inclination of many followers

of the Cartesian tradition to adopt a quasi atheist stance, in the context of which the universe was the poor product of matter and motion. In Leibnizian philosophy, the counterpart of this stance was a kind of "rational" atheism, since the principle of sufficient reason held good even for God. Newton's voluntarism was a decisive answer to these stances. The will of God was absolutely impenetrable by human intellect. The universe was not a product of natural or logical necessity but the outcome of God's unrestrained will. Fallen man had access only to the results of His choices as they were revealed by the order of universe and the laws that govern the natural phenomena.

Voltaire's interpretation of the Newtonian philosophy became popular in a great part of the European continent. The favorable attitude toward Christian faith and the countering of the Aristotelian and Cartesian dogmatism that ensued from this interpretation was an invaluable tool for those who promoted religious tolerance and moderate political reform. John Locke's survey of the limits of human knowledge served as the counterpart of this aspect of Newtonianism and comprised the basis of an intellectual current that defended freedom of thought in a variety of sociopolitical environments. As a result, experimental philosophy came to represent far more than a scientific method. It epitomized the ability of citizens to overcome the restrictions of the established authorities without disturbing the social order, to participate in the acquisition of knowledge by their own means, and to establish paradigmatic procedures of social consent that would guarantee human progress and happiness.

See also ***Cartesianism; Mathematics; Mechanical Philosophy; Physics; Philosophy.***

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NIHILISM. In a history that spans more than two and a half centuries, the term *nihilism* has been employed to denote a wide range of phenomena. It has been variously used to express contempt or horror on the one side, approval and admiration on the other. In the twentieth and twenty-first centuries, it has almost always been an emotional and axiological term, frequently employed to cut off debate on a moral issue by representing a particular position as absolute, totalizing, and extreme.

Early History of the Term

The word *nihilism* is constructed from the Latin *nihil,* "nothing," and the Greek suffix *ism.* In the compendious *Historisches Wörterbuch der Philosophie* (Historical dictionary of philosophy), Wolfgang Müller-Lauter gives 1733 as the earliest known date for the occurrence of the German *Nihilismus* and notes the rise of the word *nihilisme* in France at the end of the eighteenth century.

From the late eighteenth century through the first half of the nineteenth century, nihilism followed a course that scholars have already traced in considerable detail. Enemies of German idealism threw the term at Immanuel Kant and Johann Gottlieb Fichte, for example, protesting against the emptiness of a philosophy that denies the possibility of any reliable contact with the world of things in themselves. As European thought increasingly moved toward dispassionate, secular explanations of religious belief (holding, for example, that such belief is a natural and predictable product of human consciousness or that it reflects a natural, human tendency to generate myths), those seeking to defend traditional faith increasingly leveled the charge of nihilism against secularizing thinkers. David Friedrich Strauss (1808–1874), the famed and much reviled author of *Das Leben Jesu: kritisch bearbeitet* (1835–1836; The life of Jesus: critically examined), one of the nineteenth century's many biographies of Jesus, and Ludwig Feuerbach (1804–1872), the equally noted author of the skeptical *Das Wesen des Christentums* (1845; The essence of Christianity), were both accused of propagating nihilism. Max Stirner (pseudonym of Johann Caspar Schmidt; 1806–1856), author of the primary gospel of egoism, *Der Einzige und sein Eigentum* (1845; The ego and his own), and pre-Nietzschean messenger of the death of God, has been described as an early nihilist. All such thinkers, it was felt, had reduced to nothing (*nihil*) both faith and its transcendent object.

Nihilism in Russia and As a Russian Export

The term *nihilism* (*nigilizm* in Russian) had been used in Russia early in the nineteenth century, but it burst on the scene with particular force and with an entirely new meaning in January 1862, when Ivan Turgenev (1818–1883) published *Fathers and Sons.* Turgenev's hero, Evgeny Vasil'evich Bazarov, is a man of science, a member of the new generation who has decided that, at least in theory, nothing in the universe lies beyond the explanatory power of the empirical method. He is, in a word, a nihilist. As his callow young friend puts it to members of the older generation (the "fathers"), a nihilist is a man "who approaches everything from a critical point of view . . . who does not bow down before any authorities, who does not accept a single principle on faith, no matter how much respect might surround that principle." Bazarov dissects frogs (the better to understand human beings), denies the value of artistic expression, and is predictably flummoxed when he finds himself hopelessly in love, that is, in a condition that completely defies the very foundation of his materialist worldview.

If nihilism, as Turgenev's hero understood it, comprised both a thoroughgoing materialism and a thoroughgoing anti-aestheticism, it was already possible to find both in the apostle of the new progressive generation, Nikolai Gavrilovich Chernyshevsky (1828–1889), who would gain notoriety in 1863 as the author of the didactic novel *What Is to Be Done?* In his master's thesis, *The Aesthetic Relation of Art to Reality* (1855), Chernyshevsky had denied the existence of beauty as an autonomous quality in art, saying that beauty can be nothing more than life itself. And in *The Anthropological Principle in Philosophy* (1860), he had reduced human freedom and, for that matter, human distinctiveness, to nothing, arguing that individual freedom is an illusion as much in humanity as in the lower forms of animal life. Chernyshevsky would add a third feature to the definition of nihilism in *What Is to Be Done?* The idealized characters in his novel behave in accordance with an odd amalgam of utilitarianism and enlightened egoism, thus reducing traditional ethical values to nothing.

After the publication of *What Is to Be Done?* nihilism as a term or attitude took three principal directions in Russia. First, in literary life, it nurtured the trend toward realism. Dmitry Pisarev (1840–1868), the young critic who in a favorable review of *Fathers and Sons* helped disseminate a positive image of Turgenev's hero, took Chernyshevsky's anti-aestheticism one step farther in the 1860s, devoting a series of essays to the "destruction of aesthetics" and to the promotion of a rigidly realist style in literature. Second, in political life, the term *nihilism* came to be used, often with hostile intent, to describe a group within the revolutionary movement characterized by its unscrupulous methods and its unprincipled aims. Fyodor Dostoyevsky helped popularize this sense of *nihilism* by offering up the savage caricatures of left-wing political operatives