Pierre Gassendi | Encyclopedia.com

(*b*. Champte rcier, France, 22 January 1592; *d*, Paris, France; 24 October 1655)

Philosophy, *astronomy*, *scholarship*.

The Gassend family used the form Gassendi, according to the italianism then in style, but Pierre always signed himself Gassend. When a very young man, he was already a principal professor at Digne. His family had him continue his studies, which he pursued at Aix.

In 1614 he was accepted into minor orders and obtained a doctorate at Avignon. Two years later he took holy orders at Aix, where, from 1617 to 1623, he was charged with the teaching of philosophy. He was then initiated into astronomy by Gaultier de la Valette and into humanism by Peiresc, who became his patron.

A partisan of new ideas, Gassendi had printed in Grenoble a first volume of *Exercitationes paradoxicae*(1624) aimed against the Scholastics; he prudently withheld a second volume. His reputation—and the size of his correspondence—increased, and a cononary at Digne assured his independence (he became provost in 1634).

In Paris in 1624 and again in 1628, he met Mersenne, Mydorge, the du Puy brothers, and Luillier. In 1629-1630 he traveled with the latter in the Low Countries, where he met Isaac Beeckman.

On 7 November 1631 he observed the transit of Mercury, and in his *Mercurius in sole visus* (1632) he treated the event as a confirmation of Kepler's ideas. He returned to Digne at the end of 1632 and undertook an extensive study of Epicurus' thought, in the course of which he expressed his own. At some junctures he clearly departed from the ancient philosopher, but at others he placed statements inspired by materialism next to affirmations of orthodoxy with Which they were difficult to reconcile. He was, however, in no hurry to publish and seems even to have interrupted his researches in 1637 when Peiresc died. He resumed them again under the protection of the new governor of Aix-en-Provence, Louis de Valois, at whose behest he returned to Paris after election to the Assembly of the Clergy, a position he was obliged to renounce in 1641. At the request of Mersenne, he immediately thereafter composed the *Cinquiémes objections* to the *Meditations* of Descartes. The *Instantiae* was published in 1644.

Gassendi's growing influence led Louis de Valois and Cardinal Alphonse de Richelieu, arch bishop of Lyons, to appoint him professor of mathematics (i.e., astronomy) at the Collège Royal in Paris in 1645. He published a *Leçon inaugurale* and a *Cours*, in which he set forth the system of Copernicus, while prudently falling back on that of Tycho. He taught for only a short time, however. His health was uncertain, and in 1648 Louis de Valois called him back to Provence, where he spent several years. His *Animadversiones* of 1649 contains a portion of his works on Epicurus together with the Greek text and translation of book 10 of Diogenes Laertius.

In Paris once again in 1653, Gassendi produced a third version of his great work entitled *Syntagma Philosophicum*, but he did not resume teaching. He died at the home of his host, Habert de Montmort, and was buried at St. Nicolas des Champs on 26 October 1655.

Gassendi's *Opera omnia* was published in six volumes by his friends in Lyons (1658), according to a plan he had established himself. The first two volumes contain the *syntagma;* the third, a series of scientific works; the fourth, the astronomical lectures and observations; the fifth, the *Lives of Astronomers* and Epicurean works, as well as the *Life of Peiresc;* and the sixth, the Latin correspondence he had selected to preserve. The *Animadversiones* was not reprinted in its original form until 1675.

Although he excited the curiosity and attention of others, Gassendi did not seek to do so. He was not the leader of the "Libertines" and the future "philosophes." Olivier Bloch, in his authoritative thesis, sees in Gassendi a belated humanist rather than an avantgarde thinker.[1] There is no reason to question the sincerity of his testimonies of allegiance to a church of which he was a respected dignitary, as were his best friends, Peiresc and Mersenne. His true intellectual master was Galileo. In the *Exercitationes* of 1624 Gassendi had demonstrated his philosophic independence, and as early as 12 July 1625 he wrote to Galileo that he shared his Copernican ideas. But he never had to suffer the anxieties of the great Florentine. His choice of Epicurean atomism as a framework for the exposition of his ideas appears to have been more a revolt against Scholasticism than the expression of any profound conviction. Moreover, his erudition embraced all doctrines, including those of the church fathers, whereas he rejected such important elements of Epicureanism as the vertical fall and swerving of atoms.

Gassendi's eclecticism was that of a skeptic assured that no one doctrine penetrates to the essence of things—indeed, this is a constant aspect of his thought. Yet he proceeded as would a historian for whom the human mind had exhausted all possibilities, in contrast to Descartes, who wrote as if unaware that anyone had ever done philosophy before him. Gassendi's first published letter (to Pibrac, 8 April 1621) reveals an extreme diversity in what he chose to adopt and a great deal of personal assurance; he rejected only dogmatism, even when Epicurean. Bound by no fixed viewpoint, he could more easily go along with the traditions of his peasant milieu. If his morality preached happiness, his method for attaining it was conformist. A worldly type like Saint-Évremond thought him timid. A fanatic like J.-B. Morin consigned him to the flames. Descartes accused him of nothing less than materialism—thereby contributing more than slightly to the suspicion in which he was held. Gassendi, in turn, treated Descartes as a dogmatist. Moreover, he disappointed the materialists. Gassendi wished, Karl Marx declared, to put a nun's habit on the body of Lais.[2] In reality, Gassendi, believing Aristotle's metaphysics to be pagan, attempted to establish a metaphysics that would be Christian, but in harmony with the fundamentally anti-Aristotelian contemporary science.

In this undertaking Gassendi may simply have become aware of his own ambiguities.[3] A thorough study of the philosophical manuscripts preserved at Carpentras, Tours, and the Laurentian Library, and also of the published works; which repeat and correct each other (*Disquisitio*, 1644; *Animadversiones*, 1649; and the posthumous *Syntagma*, 1658), reveals neither the duplicity nor the denial suspected by Pintard[4] but rather an effort to bring the Epicurean elements, accompanied by their materialist tendency, together with the traditional Christian elements. The two had previously been juxtaposed in Gassendi's writings without being mingled—but not without contradiction. This became evident after the beginning of the dispute with Descartes in 1641 and in the new drafts of the Epicurean works first undertaken in 1642. The factors that Gassendi emphasized to achieve a synthesis between Epicureanism and Christianity were nominalism, finality, and vitalistic or chemical analogies. A discussion of these factors is required before asking whether Gassendi felt that Descartes's reproaches really hit their target.

Nominalism had been born in a Christian atmosphere, where it remained a minority position, inspired by awareness of the limits of human understanding (*modulus intellectionis*). Feeble beings that they are, men (*homonciones*) cannot reach essential truth but only appearances, or phenomena, conditioned by laws that they did not make and cannot understand. God established these laws in order that things might endure and satisfy the needs of living creatures. Man establishes a system of signs, of names, which permits him to identify things perceived and to communicate with other men. But the concepts thus formed are conventions, not universal propositions. The universal does not exist ontologically. God has given man a mind capable only of conceiving the universal as the result of repeated contacts between the senses and well-ordered material realities. In animals imagination and memory record the facts to be retained. In man the rational spirit enables him to combine these representations with a view to action, guided by coherent predictions and based on reflections that take time and that are true inferences and not intuitions of some reality beyond the reach of sensation. But there is an evident providential finality in the Creation thus interpreted, and it is further illustrated by the wonders of the universe, of which man is the consummation and the goal. Hence, final causes are the "Royal Way," They demonstrate the existence of God. The view was opposed to that of Descartes; and Gassendi, incidentally, refuted the ontological argument on which Descartes relied in much the same way that Kant later did.

Gassendi held that the atoms were the first things created, not in infinite number, as Democritus had said, but in a number sufficient to create the finite universe we know. They are endowed with an unalterable (in French *inamissible*) movement propelling them without interference in all directions through the void. There is no swerving (no *clinamen*). The collisions that necessarily take place annul motion and result in the appearance of immobility. Collisions form molecules which are particles identifiable by several attributes. The homogeneous atomic particles for their part are endowed only with shape, resistance, minimum size, and a "weight" that is the effect of their elementary movement. Molecules combine in fewer ways than atoms to form sensible, objects, possessing not powers, or internal qualities capable of activity, but mechanical forces. Various circumstances may liberate these forces in such a manner that impressions are made on other objects, notably the senses of living beings. At this level, other forces become effective—for example, chemical forces.[5].

The dynamism that is sometimes noticed in Gassendian physics, and that justifies the expression *semina rerum* (borrowed from Lucretius) to designate the atoms, was merely this accumulation of an energy potential, conceivable even in biology. For living bodies are subjected to the same laws as others. Life is composed of movements of the "flower of matter," the animal soul, which in a way resembles Descartes's animal spirits and subtle matter. Science is thus relative to our needs; a view in which there was both sensationalism and pragmatism. Thus, Gassendi was not only a belated humanist but also a precursor of Locke, Condillac, and the positivists and empiricists of the eighteenth and nineteenth centuries.

These ideas contained the entire arsenal upon which future materialists could draw. Yet Gassendi had no thought of being a materialist in the later sense of d'Holbach or Marx. The clash with Descartes had revealed to him the way in which his works, still unpublished, could scandalize certain readers; his role as a priest led him to take this danger into account. But until then he had been able to conjoin faith with Epicureanism with as little fear as Galileo had earlier felt in juxtaposing Copernicus and the Bible.

Galileo had pointed out in his letter to the grand duchess of Florence (see below) that the Bible had originally been addressed to the early Jews in terms that they could understand, while Copernicus, for his part, had offered his work to the pope, and it was not at first thought heretical. By the same token, in Gassendi's view, God had the power to make the world from atoms, as the Epicureans held, and was equally able to illuminate it by making the earth revolve around the sun on the Copernican hypothesis.

Galileo explained his theological position in relation to science in 1615 in his letter to the grand duchess of Florence. Christine of Lorraine. The argument was immediately and widely disseminated, and Gassendi undoubtedly saw it at Aix. It was published in Latin in Strasbourg as early as 1635.[6] although in response to the condemnation of 1633. Descartes's opposition also obliged Gassendi to take "precautions." The word is Mersenne's, who, by publishing the *Cinquiémes objections* had provoked the dispute with Descartes. He spoke of precautions in praising Gassendi's works in a letter to Rivet (8 February 1642).[7] That was precisely the date on which Gassendi undertook a new draft of his Epicurean works. Gassendi may probably have made these modifications in order to persevere in the same project, not to remove ambiguities or to modify it in some unexpected way. Mersenne gave his approbation to the earlier version, while expressing satisfaction with improvements in the new edition. Freethinkers were the only ones who judged differently and for their own reasons: they hoped that this physics would teach man to dispense with metaphysics.[8].

Was such a result what Gassendi wished? Not at all. In the seventeenth century it was possible to conceive of God's having created the universe in a single stroke, but after a model that permits the most convenient analysis. The "fable du monde," which Descartes imagined to be separate from dogma without contradicting it, played a finalist role despite its author's intentions. The atomic model could be employed in the same fashion. An admirer of Gassendi, the physician Deschamps, asked whether, without impiety, one could say that.[9].

Gassendi's influence on epistemology may now be stated more precisely. Koyré summarized it by saying that Gassendi contributed to the new science "the ontology that it needed,"[10] In order to eliminate "powers" and "acts," "accidents" and "qualities," whether occult or not, it was necessary to suppose fixed and measurable data in a medium that in no way influences what is observed. Such are the atoms, endowed with shape, solidity, impenetrability, and a natural tendency to motion, which is weight. Such is the void in which bodies move without interference and without any change occurring in their nature through mere endurance. Time does not "eat away" at things; rather their mechanical and spatial relations change in the course of time. Contrary to the Scholastic view, space and time are neither substance nor accident. They exist when their content disappears and when nothing is happening. They establish the general frame of any knowledge of reality—with atoms redividing in a homogeneous void and moving in the unalterablecourse of time. Gassendi was one of the first to state this universal, categorial law of space and time.

Despite his influence on the ontology of classical physics, Gassendi's scientific successes were not of the first rank. He owed what he achieved to his fidelity to the Democritean schema. Thus his study of *Parhélies* (1630) suggests a corpuscular explanation of light. His patient and thorough method made him a pioneer of observational astronomy, in which field Galileo had already set the example in 1610.[11] But the observations, which almost fill the fourth volume of his *Oeuvres*, could serve only as a model for his contemporaries without leading him to any major discovery. For example, he corrected the geographical coordinates acknowledged for use in navigation in the Mediterranean, and he rejected the discovery of Jupiter's new satellites announced by de Rheita in 1643.

The observation of the transit of Mercury, in which he alone was successful and which confirmed Kepler and, indirectly, Copernicus, caused widespread discussion. Koyré, however, reproaches him for having disregarded the mathematical form that enabled Kepler to determine the elliptical orbits of the Planets.[12] Numerous sketches of various aspects of Saturn did not suggest to him the ring hypothesis, which Huygens proposed in 1659 without access to information that was much superior. Gassendi remained a prisoner of what the senses, even when fortified, are able to show. The *Cours* of 1644 at the Collége Royal (published in 1647) prudently presented Tycho Brahe together with Copernicus, while leaning sufficiently toward the latter to shock J.-B. Morin. In the *De proportione qua gravia decidentia accelerantur* of 1645, as in the *De motu impresso*, Gassendi defended—against the criticism of Le Cazre—the law of freely falling bodies, in which velocity is proportional to the square of the time elapsed and not to the distance traversed. But he never understood the importance of its having been deduced either from simple observations of motion on an inclined plane or in any other way.

In 1654 Gassendi joined to his other lives of astronomers the *Life of Copernicus*, in which the trial of Galileo, although not omitted, is barely mentioned. He thus insisted on the hypothetical and mathematical character of Copernicus' work, whereas in 1647 the *Institutio astronomica* had explained the condemnation of Galileo by considerations relating to Galileo himself, but presenting no objections to Copernicus' theories.[13] It is further worth noting that Gassendi followed Galileo in the error of regarding the phenomen on of the tides as a proof of the motion of the earth. As was well known, the periodicity of the tides does not correspond to that of the diurnal movement, and Descartes did not make this mistake.[14].

On one point—and it is an important one— Gassendi was more successful than Galileo: he correctly stated the principle of inertia. The experiment of the *De motu impresso a motore translato*, performed in 1640 in Marseilles, overthrew the argument of Copernicus' opponents against the movement of the earth. Gassendi arranged to have a weight dropped from the top of a vertical mast on a moving ship in order to demonstrate that it fell at the foot of the mast and not behind it, thus sharing in its fall the forward motion of the ship. Galileo considered the experiment unnecessary; he foresaw the result by reasoning.[15] Others, notably Bruno, had already spoken of it. But Gassendi understood that the composition of motions is a universal phenomenon: Every movement impressed on a body in motion in any direction whatsoever persists in Democritean space, which has neither up nor down. Motion is, in itself, a physical state, a measurable quantity, not— as the Scholastics maintained—the change from one state to another. It changes only through the interposition of another movement or of an obstacle.

Furthermore, Gassendi also corrected the formulation given by Kepler, for whom inertia was a tendency to rest: in classical physics, inertia is indifference to both motion and rest. On this point, Gassendi was guided by Galileo's experiments on the pendulum, in which motion is maintained without any supplementary impetus. In addition, Kepler's idea of magnetic effluents or forces gave him an, intimation of the existence of universal attraction or, rather, universal interaction—although he was no more successful than Descartes in conceiving its transmission otherwise than by contact.[16].

Gassendian atoms and Cartesian subtle matter belong, as has been seen, to a single period of thought. Moreover, the idea of inertia was common to Beeckman, Gassendi, and Descartes, who all knew each other, and we know that Newton read Gassendi, as did Boyle and Barrow.

In 1650, on a mountain near Toulon, another experiment repeated the famous one of the Puy-de-Dôme.[17] Gassendi fully appreciated the value of Pascal's work. But the latter, in the *Èquilibre des liquerş*,,[18] speaks indiscriminately of "weight and pressure of the air," whereas, guided by the corpuscular picture and not by the hydrostatic scheme referred to in Pascal's title, Gassendi could differentiate weight (which is constant for a given mass of air) from pressure (which varies according to the state of agitation, dilation, or contraction of this same mass). It is variations in pressure that affect the barometer and that measure not only the approximate height of the "column of air" but also the changes of state of the atmosphere, which are capable of influencing subsequent weather conditions. Of course, the barometric vacuum proves that the natural vacuum is not impossible; but what happens in the tube depends only an what happens outside. Koyré rightly points out that in this regard Gassendi anticipated Boyle, who read him closely and regretted not having done so earlier.[19].

Gassendi applied his empirical and experimental sagacity to other fields, often in collaboration with Mersenne. Together they estimated the speed of sound as 1,038 feet per second, a passable approximation for the time.[20] Physiology and dissection also interested Gassendi, as did all of natural history. However, he never completely renounced a false observation made at Aix in his youth when Payen made him "see" a communication between the two parts of the heart; but at least he esteemed Harvey and Pecquet. Numismatics and music also occupied him on occasion.

It is evident that Gassendi's influence on science was more philosophical than technical and more critical than systematic. He rationalized physics, by introducing quantity into it through the measurements he undertook but above all by introducing atoms, those mutually combinable units that are capable of joining together in molecules and of producing measurable bodies. It is regrettable that with excessive modesty he reframed from propounding general views of the sort that can direct and enrich experiment a priori and that he did not envisage the possibility of applying mathematics to concrete, physical cases.[21].

NOTES

1. In Gassendi one sees primarily a precursor of Locke and Condillae, mentioned later in this article, as well as Hume, See *Tricentenaire de Gassendi*, pp.69, 227.

2. "Avant-propos" to "Mémoire sur Démocrite et Épicure." in *Oeuvres*, J. Molitor. trans., I (Paris, 1946), xxii.

3. This and the following three paragraphs have been freely inspired by the excellent thesis of M. Bloch (see below), who generously lent it to the author.

4. Cf. *Libertinoge érudit* (Paris. 1943). p. 301, *passim*.

5. On this point, Bloch rehabilitates Etienne de Clave, a chemist condemned in 1624 by the Parlement of Paris.

6. Letter, in *Le opere di Galileo Galilei*. Favaro, ed. (Florence. 1890-1909), V, 309 ff. Gassendi does not approach the position of "double truth" to the extent that Bloch (see especially his ch. 11) thinks he does in his desire to reconcile Epicureanism and literal dogma. He thought he could juxtapose not two truths but facts equally real although differently expressed. Misunderstanding." taught him what "precautions" (see following note) to take, precautions that Bloch sets forth with extreme precision; but these do not go as far as fideism.

7.*Correspondence du P. Mersenne*, XI, 38: "M. Gassendi réfute puissament, dans sa Philosophie Épicurienne, tout ce qui est contre le christianisme, et, comme vous avez fort bien remarqué, il y prend des précautions." Rivet did not necessarily see what Mersenne was talking about. Mersenne, however, knew the drafts that preceded the one begun on this date as well as the drafts of the *Instantiae*, which was later joined to the *Cinquièmes objections* and Descartes's *Responsa* to form the *Disquisitio metaphysica* (1644).

8. The author's conclusions in this and the preceding paragraph are inspired by new material introduced by Gassendi in later editions that has been studied in depth by Bloth; the author's opinions differ, in accordance with his knowledge of the respective positions of Descartes, Galileo, Gassendi, and mersenne in regard to each other.

9. Letter of 14 Aug. 1642, in *Correspondence du P. Mersenne* XI, 229-231.

10.*Tricentenaire*, pp. 176, 186.

11. Galileo sent Gassendi a telescope through Diodati; see letter of 25 July 1634 from Galileo to Diodati.

12.*Tricentenarie*, p. 188. n. 9. However, the *Syntagma*, I, 639a-b, mentions the elliptical trajectories of kepler.

13.*Opera omnia* (Lyons, 1658), V, 60b, end of book III, ch. 10.

14.*Principes*, IV, 49-52.

15.*Dialogo*, in *Le operer di Galileo Galilel*, VII 171; and Koyré *Etudes galiléennes*, pp. 215, 229, 249, 252; and in *Tricentenaire*, pp. 189 ff.

16. Despite everything that set them apart, Descartes and Gassendi were often bracketed by authors of the end of the seventeenth century. See also n. 5 and the corresponding text.

17. Gassendi had spoken of the Puy-de-Dôme experiment in a supp, to the *Animadversiones* (1649) and of his own in a letter (6 Aug. 1652) to Bernier, who had assisted him in that experiment. (Dating the letter "anno superiore," he called Bernier's memory into question: his own "diaire" testified that the experiment took place on 5 Feb. 1650.) All this is taken up again in the *Syntagma* (*Opera omnia*, I, 203-216). See Rochot's articles in *Aventure de l'esprit* (Mélanges Koyré) and in Koyré, *Tricentenaire*, pp. 184 ff.

18. Pléiade ed., pp. 383 ff.

19.*Tricentenaire*, pp. 184 ff,; see also Bloch, ch., 8, especially n. 190, opposing Koyré.

20.*Tricentenaire*, p. 180.

21. Did Did Gassendi read the *Saggiatore*? See *Le opere di Galileo Galilei*, VI, 232, as well as the letter to Liceti (Jan, 1641), *ibid*., XVIII, 295: "The book of nature is written in mathematical language,"

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I. Original Works. The contents of the six vols. of the *Opera omina* (Lyons, 1658), with a preface by Sorbiére, are summarily described in the text. The work has been reprinted twice: N. Averrani, ed. (Florence, 1727); and in facs. (Stuttgart, 1964), with a pref. by T. Gregory.

Following is a list of Gassendi's principal individual works.

Scientific Works. Into this class fall *Mercurius in sole visus et Venus invisa* (Paris, 1632; 1658 ed., vol. IV); *De apparente magnitudine solis humilis et sublimis epistolae quatuor* (Paris, 1642; 1658 ed., vol, III); *De motu impresso a motore translato epistolae duae* (Paris, 1642; 1658 ed., vol. III), two letters to Dupuy, to which a third, to Gautier *contra* Morin and datged 1643, was added in the 1658 ed. (Gassendi's friends had published the Gautier letter earlier [Lyons, 1649] without his knowledge); *Oratio inauguralis habita in Regio Collegio, anno 1645, die Novembris XXIII, a P. Gassendo* (Paris, 1645; 1658 ed., vol IV); *De proportione qua gravia decidentia accelerantur* (Paris, 1646; 1658 ed., vol. III); *Institutio astronomica juxta hypotheseis tam veterum quam Copernici et Tychonis. Dictata a Petro Gassendo. Ejusdem oratio inauguaralis iterato edita* (Paris, 1647; 1658 ed., vol. IV); and *Tychonis Brahei . . . N. Coernici, G. peurbachi et J. Regiomontani . . . vitae* (Paris, 1654; 1658 ed., vol V).

Philosophical Works. This second class includes *Exercitationum paradoxicarum adversus Aristoteleos libri septem, in quibus praecipua totius Peripateticae doctrinae atque dialecticae excutiuntur; opinions vero aut nove, aut ex vetustioribus obsolete stabiliuntur, liber primus: In doctrinam Aristoteleorum universe*, issued independently (Grenoble, 1624); bk. 2, *In dialecticam Aristoteleorum*, did not appear until the 1658 ed. (vol. III) with the shortened title *Exerctitationes paradoxicae adversus Aristoteleos, in quibus . . .* It was separately published shortly afterward as *Exercitationum paradoxicarum liber alter in quo dialecticae Aristoteleae fundamenta excutiuntur* (The Hague, 1659); a text and French trans. appeared as *Dissertations en forme de paradoxes contre les aristotéliciens*, B. Rochot, ed. and trans. (Paris, 1959), in which bk. 2. is corrected according to the MS at the Laurentian Library (this MS was formerly at Tours but was stolen from there by Libri).

Epistolica exercitatio, in qua praecipua principia philosophiae R. Fluddi, medici, reteguntur, et ad recentes illius libros adversus R. P. F. Marinum Mersennum scriptos respondetur (Paris, 1630; 1658 ed., vol. III).

The *Disquisitio metaphysica seu dubitationes et instanitae adversus R. Cartesii metaphysicam, et responsa* (Amsterdam, 1644; 1658 eds., vol. III) consists of the *Objectiones quintae* of 1641 with the publisher Sorbuère's addition of the *Instantiae* of 1642,

after Descartes's *Responsa*. A text and French trans. of the *Disquisitio* was published as *Recherche de la métaphysique*, B. Rochot, ed. and trans. (Paris, 1962).

De vita et moribus Epicuri libri octo (Lyons, 1647; 1658 ed., vol. V).

Animadversiones in decimum librum Diogenis Laërtii, qui est de vita, moribus placitique Epicuri, 3 vols, (Lyons, 1649; 2nd ed., 2 vols., 1675), was reproduced only in part in the 1658 ed. The Greek-Latin text of Diogenes, with philological notes, does appear in vol. V. The reworked doctrinal commentary was incorporated into the *Syntagma philosophicum* (see below). The *Philosophiae Epicuri syntagma, cum refutationibus dogmatum quae contra fidem christanam ab eo asseta sunt, oppositis per Perum Gassendum* (1658 ed., vol. III), a sort of Epicurean breviary added as an appendix to to vol. II of the *Animadversiones*, appeared separately (The Hague, 1659) with the preface that Sorbière had placed at the head of the 1658 ed.

His masterpiece, *Syntagma philosophicum (logica, physica, ethica)*, was published posthumously (1658 ed., vols. I–II).

Correspondence. The *Letters familières àFr. Luillier (hiver 1632-33)*, B. Rochot, ed. (Paris, 1944), is based on a MS that belonged to the heirs of the provost of Digne, now in the Bibliothèque Nationale (fonds latin 2643). The MS contains Gassendi's drafts of the Latin letters in vol. VI of the 1658 ed. Most of the letters addressed to him in the same vol. are in the Bibliothèque Nationale. The French correspondence with Peiresc is in *Lettres de Peiresc*, Tamizey de Larroque, ed., IV (Paris, 1893). Gassendi is frequently mentioned in correspondence of the period; see especially *Correspondence du. P. Mersenne*, C. de Waard, Marie Tannery, and B. Rochot, eds. (Paris, 1932-). The bulk of his extensive correspondence in French and Latin is far from entirely known.

Miscellanleous Works. The biography *De Nicolai Claudii Fabricii de Peiresc, senatoris aquisextiensis, vita* (Paris, 1641; 1658 ed., vol. V) appeared in English as *The Mirrour of True Nobility and Gentility, Being the Life of . . . N.C. Fabricius, Lord of Periesk*, W. Rand, trans, (London, 1657). It is especially useful as a source for the historian of early seventeenth-century science.

A curious, and anonymous, pamphlet of 1654 designed to calm widespread fears occasioned by an eclipse of the sun is reasonably attributed to Gassendi. It was reprinted by B. Rochot, ed., in *Bulletin de la Société d'tude du XVII^e^siècle*, no 27 (Apr. 1955), 161-177.

II.Secondary Liteature. The following items have been selected from the bibliography (343 items, including MSS, printed texts, biographical and doctrinal studies, and various articles) in the thesis of Olivier René Bloch, *La philosophie de Gassendi: Nominalisme, matérialisme et méta physique* (Paris, 1971); F. Bernier, *Abrégé de la philosophie de Gassendi*, 2nd ed., 7 vols, (Lyons, 1684); Henri Berr, *Du scepticisme de Gassendi*, B. Rochot, trans. (Paris, 1960), a trans, of the 1898 thesis *An jure inter scepticos Gassendus numeratus fuerit*; [J. Bougerel], *Vie de Pierre Gassendi* (Paris, 1737), which should be examined carefully because the author had access to documents that are now lost; G. S. Brett, *Philosophy of Gassendi* (London, 1908); G. Cogniot, "Pierre Gassendi, restaurateur de l'épicurisme," in *La pensée*, no. 63 (Sept.-Oct. 1955); P. Damiron, *Histoire de la phiosophie au XVII^e^siècle* (Paris-Neuchâtel, 1954), ch. VI, pp. 103-116; Tullio Gregory, *Scietticismo ed empirismo, Studio su Gassendi* (Bari, 1961); Pirre Humbert, *L'oeuvre astronomique de Gassendi* (Paris, 1936), completed by *philosophes et savants* (Paris, 1953), pp. 79-107; A Koyré, *Études galiléennes* (Paris, 1939), pp. 237 ff., repr. (Paris, 1966), pp. 304 ff,; F. A. Lange, *Geschichte der Materialismus und Kritik senier Bedeutung in der Gegenwart*, 2nd ed., 2 vols. (Iserlohn, 1837-1875), which appeared un French as *Histoire du matérialisme*, B. Pommerol, trans., 2 vols, (Paris, 1921), and in English as *The History of Materialsm . . .* , E. C. Thomas, trans., 3rd ed. (London, 1957), contains a section on Gassendi; Kurd Lasswitz, *Geschichte der Atomistik vom Mittelalter bis Newton*, 2 vols. (Hamburg-Leipzig, 1890; 2nd ed., 1928), II, 126-188; L. Mabilleau, *Histoire de la philosophie atomistiue* (Paris, 1895), pp. 400-422: P. Pendzig, *Pierre Gassendis Metaphysik . . .* (Bonn, 1908); René Pintard, *Libertinage éudit*, 2 vols. (Paris, 1943), which contains, in vol. I, numerous analyses in which Gassendi is portrayed as the leader of libertine *tétrade and*, in vol. II, an important bibliography (see also the MSS examined in his *La Mothe le Vayer, Gassendi, Guy Patin* (Paris, 1943]); B. Rochot, *Les travaux de Gassendi sur Épicure et l'atomisme* (Paris, 1944); G. sortais, *La philosophie moderne depuis Bacon jusquà Leibniz*, II (Paris, 1922); J. S. Spink, *Free Thought From Gassendi to Voltaire* (London, 1960); and P. F. Thomas, *La philosophie de Gassendi* (Paris, 1889), More a summary than an interpretation, it does not take into account the evolution of Gassendi's thought as represented by the *Syntagma*. Two collections of studies are *Pierre Gassendi, sa vie et son oeuvre*, Centre International de Synthèse (Paris, 1955); and *Tricentenaire de Gassendi*, Actes du Congrès de Digne, 1955 (Paris-Digne, 1957).

The MSS enumerated by Bloch are in the Bibliothéque Nationale and in the libraries of Tours (706-710), Carpentras, and Florence (Laurentian). Biographical documents are at Aix-en-Provence, Digne, Grenoble, Marseilles, Munich, Oxford, Stuttgart, and Vienna; in the Archives du Ministère de la Guerre, Paris; and in the Bibliothèque Nationale (fonds français 12270 and fonds Dupuy.

Some texts have been translated into Polish by H. L. Kolakowski (Cracow, 1964) and into Russian by Sitkovsky (Moscow, 1966), with Studies.

It should be noted that the important study by G. Gusdorf, *Révolution Galilèenne*, vol III. of Les Sciences Humaines et la Pensée Occidentale, 2 vols. (Paris, 1969), was used in the preparation of this article.

Bernard Rochot.