

another. In every such series or group there is a dominant element, simple and irresoluble, the standard on which the rest of the series depends, and hence, so far as that group or series is concerned, absolute. The other members of the group are relative and dependent, and only to be understood as in various degrees subordinate to the primitive conception. The characteristic by which we recognize the fundamental element in a series is its intuitive or self-evident character; it is given by "the evident conception of a healthy and attentive mind so clear and distinct that no doubt is left."¹ Having discovered this prime or absolute member of the group, we proceed to consider the degrees in which the other members enter into relation with it. Here deduction comes into play to show the dependence of one term upon the others; and, in the case of a long chain of intervening links, the problem for intelligence is so to enunciate every element, and so to repeat the connection that we may finally grasp all the links of the chain in one. In this way we, as it were, bring the causal or primal term and its remotest dependent immediately together, and raise a derivative knowledge into one which is primary and intuitive. Such are the four points of Cartesian method:—(1) Truth requires a clear and distinct conception of its object, excluding all doubt; (2) the objects of knowledge naturally fall into series or groups; (3) in these groups investigation must begin with a simple and indecomposable element, and pass from it to the more complex and relative elements; (4) an exhaustive and immediate grasp of the relations and interconnection of these elements is necessary for knowledge in the fullest sense of that word.²

"There is no question," he says in anticipation of Locke and Kant, "more important to solve than that of knowing what human knowledge is and how far it extends." "This is a question which ought to be asked at least once in their lives by all who seriously wish to gain wisdom. The inquirer will find that the first thing to know is intellect, because on it depends the knowledge of all other things. Examining next what immediately follows the knowledge of pure intellect, he will pass in review all the other means of knowledge, and will find that they are two (or three), the imagination and the senses (and the memory). He will therefore devote all his care to examine and distinguish these three means of knowledge; and seeing that truth and error can, properly speaking, be only in the intellect, and that the two other modes of knowledge are only occasions, he will carefully avoid whatever can lead him astray."³ This separation of intellect from sense, imagination, and memory is the cardinal precept of the Cartesian logic; it marks off clear and distinct (*i.e.*, adequate and vivid) from obscure, fragmentary, and incoherent conceptions.

The *Discourse of Method* and the *Meditations* apply what the *Rules for the Direction of the Mind* had regarded in particular instances to our conceptions of the world as a whole. They propose, that is, to find a simple and indecomposable point, or absolute element, which gives to the world and thought their order and systematization. The grandeur of this attempt is perhaps unequalled in the annals of philosophy. The three main steps in the argument are the veracity of our thought when that thought is true to itself, the inevitable uprising of thought from its fragmentary aspects in our habitual consciousness to the infinite and perfect existence which God is, and the ultimate reduction of the material universe to extension and local movement. These are the central dogmas of logic, metaphysics, and physics, from which start the subsequent inquiries of Locke, Leibnitz, and Newton. They are also

¹ Œuvres, xi. 212. ² Disc. de Méthode, part ii. ³ Œuvres, xi. 243.

the direct antitheses to the scepticism of Montaigne and Pascal, to the materialism of Gassendi and Hobbes, and to the superstitious anthropomorphism which defaced the re-awakening sciences of nature. Descartes laid down the lines on which modern philosophy and science were to build. But himself no trained metaphysician, and unsusceptible to the lessons of history, he gives but fragments of a system which are held together, not by their intrinsic consistency, but by the vigour of his personal conviction transcending the weaknesses and collisions of his several arguments. "All my opinions," he says, "are so conjoined, and depend so closely upon one another, that it would be impossible to appropriate one without knowing them all."⁴ Yet every disciple of Cartesianism seems to disprove the dictum by his example.

The very moment when we begin to think, says Descartes, when we cease to be merely receptive, when we draw back and fix our attention on any point whatever of our belief,—that moment doubt begins. If we even stop for an instant to ask ourselves how a word ought to be spelled, the deeper we ponder that one word by itself the more hopeless grows the hesitation. The doubts thus awakened must not be stifled, but pressed systematically on to the point, if such a point there be, where doubt confutes itself. The doubt as to the details is natural; it is no less natural to have recourse to authority to silence the doubt. The remedy proposed by Descartes is (while not neglecting our duties to others, ourselves, and God) to let doubt range unchecked through the whole fabric of our customary convictions. One by one they refuse to render any reasonable account of themselves; each seems a mere chance, and the whole tends to elude us like a mirage which some malignant power creates for our illusion. Attacked in detail, they vanish one after another into as many teasing spectra of uncertainty. We are seeking from them what they cannot give. But when we have done our worst in unsettling them, we come to an ultimate point in the fact that it is we who are doubting, we who are thinking. We may doubt that we have hands or feet, that we sleep or wake, and that there is a world of material things around us; but we cannot doubt that we are doubting. We are certain that we are thinking, and in so far as we are thinking we are. *Je pense, donc je suis*. Of this we cannot doubt, and therefore this is true. In other words, the criterion of truth is a clear and distinct conception, excluding all possibility of doubt.

The fundamental point thus established is the veracity of consciousness when it does not go beyond itself, or does not postulate something which is external to itself. We are thinking; we are minds; and from the mere primary intuition, which results when we analyze our doubts, we cannot tell that we are more. At this point Gassendi arrested Descartes and addressed his objections to him as pure intelligence,—*O mens!* But even this *mens*, or mind, is but a point—we have found no guarantee as yet for its continuous existence. The analysis must be carried deeper if we are to gain any further conclusions.

Amongst the ideas or elements of our thought there are some which we can make and unmake at our pleasure; there are others which come and go without our wish; there is also a third class which is of the very essence of our thinking, and which dominates our conceptions. We find that all our ideas of limits, sorrows, and weaknesses presuppose an infinite, perfect, and ever-blessed something beyond them and including them,—that all our ideas, in all their series, converge to one central idea, in which they find their explanation. The formal fact of thinking is what constitutes our being; but this thought of which we

⁴ Œuvres, vii. 381.

are certain leads us back, when we consider its concrete contents, to the necessary pre-supposition on which our ideas depend, the ultimate totality in which they are all reconciled, the permanent cause on which they and we as conscious beings depend. We have therefore, says Descartes, the idea of an infinite, perfect, and all powerful being which cannot be the creation of ourselves, and must be given by some being who really possesses all that we in idea attribute to him. Such a being he identifies with God. But the ordinary idea of God can scarcely be identified with such a conception. "The majority of men," he says himself, "do not think of God as an infinite and incomprehensible being, and as the sole author from whom all things depend; they go no further than the letters of his name."¹ "The vulgar almost imagine him as a finite thing." The God of Descartes is not merely the creator of the material universe; he is also the father of all truth in the intellectual world. "The metaphysical truths," he says, "styled eternal have been established by God, and, like the rest of his creatures, depend entirely upon him. To say that these truths are independent of him is to speak of God as a Jupiter or a Saturn,—to subject him to Styx and the Fates."² The laws of thought, the truths of number, are the decrees of God. The expression is anthropomorphic, no less than the dogma of material creation; but it is an attempt to affirm the unity of the intellectual and the material world. Descartes establishes a philosophic monotheism,—by which the mediæval polytheism of substantial forms, essences, and eternal truths fades away before God, who is the ruler of the intellectual world no less than of the kingdom of nature and of grace.

To attach a clear and definite meaning to the Cartesian doctrine of God, to show how much of it comes from the Christian theology and how much from the logic of idealism, how far the conception of a personal being as creator and preserver mingles with the pantheistic conception of an infinite and perfect something which is all in all, would be to go beyond Descartes and to ask for a solution of difficulties of which he was scarcely aware. It seems impossible to deny that the tendency of his principles and his arguments is mainly in the line of a metaphysical absolute, as the necessary completion and foundation of all being and knowledge. Through the truthfulness of that God as the author of all truth he derives a guarantee for our perceptions in so far as these are clear and distinct. And it is in guaranteeing the veracity of our clear and distinct conceptions that the value of his deduction of God seems in his own estimate to rest. All conceptions which do not possess these two attributes—of being vivid in themselves and discriminated from all others—cannot be true. But the larger part of our conceptions are in such a predicament. We think of things not in the abstract elements of the things themselves, but in connection with, and in language which presupposes, other things. Our idea of body, *e.g.*, involves colour and weight, and yet when we try to think carefully, and without assuming anything, we find that we cannot attach any distinct idea to these terms when applied to body. In truth therefore these attributes do not belong to body at all; and if we go on in the same way testing the received qualities of matter, we shall find that in the last resort we understand nothing by it but extension, with the secondary and derivative characters of divisibility and mobility.

But it would again be useless to ask how extension as the characteristic attribute of matter is related to mind which thinks, and how God is to be regarded in reference to extension. The force of the universe is swept up and gathered in God, who communicates motion to the parts of

¹ Œuvres, vi. 132.

² Œuvres, vi. 109.

extension, and sustains that motion from moment to moment; and in the same way the force of mind has really been concentrated in God. Every moment one expects to find Descartes saying with Hobbes that man's thought has created God, or with Spinoza and Malebranche that it is God who really thinks in the apparent thought of man. After all, the metaphysical theology of Descartes, however essential in his own eyes, serves chiefly as the ground for constructing his theory of man and of the universe. His fundamental hypothesis relegates to God all forces in their ultimate origin. Hence the world is left open for the free play of mechanics and geometry. The disturbing conditions of will, life, and organic forces are eliminated from the problem; he starts with the clear and distinct idea of extension, figured and moved, and thence by mathematical laws he gives a hypothetical explanation of all things. Such explanation of physical phenomena is the main problem of Descartes, and it goes on encroaching upon territories once supposed proper to the mind. Descartes began with the certainty that we are thinking beings; that region remains untouched; but up to its very borders the mechanical explanation of nature reigns unchecked.

The physical theory, in its earlier form in the *World*, and in its later in the *Principles of Philosophy* (which the present account follows), rests upon the metaphysical conclusions of the *Meditations*. It proposes to set forth the genesis of the existing universe from principles which can be plainly understood, and according to the acknowledged laws of the transmission of movement. The idea of force is one of those obscure conceptions which originate in an obscure region, in the sense of muscular power. The true physical conception is motion, the ultimate ground of which is to be sought in God's infinite power. Accordingly the quantity of movement in the universe, like its mover, can neither increase nor diminish. The only circumstance which physics has to consider is the transference of movement from one particle to another, and the change of its direction. Man himself cannot increase the sum of motion; he can only alter its direction. The whole conception of force may disappear from a theory of the universe; and we can adopt a geometrical definition of motion as the shifting of one body from the neighbourhood of those bodies which immediately touch it, and which are assumed to be at rest, to the neighbourhood of other bodies. Motion, in short, is strictly locomotion, and nothing else.

Descartes has laid down three laws of nature, and seven secondary laws regarding impact. The latter are to a large extent incorrect. The first law affirms that every body, so far as it is altogether unaffected by extraneous causes, always perseveres in the same state of motion or of rest; and the second law that simple or elementary motion is always in a straight line.³ These doctrines of inertia, and of the composite character of curvilinear motion, were scarcely apprehended even by Kepler or Galileo; but they follow naturally from the geometrical analysis of Descartes.

Extended body has no limits to its extent, though the power of God has divided it in lines discriminating its parts in endless ways. The infinite universe is infinitely full of matter. Empty space, as distinguished from material extension, is a fictitious abstraction. There is no such thing really as a vacuum, any more than there are atoms or ultimate indivisible particles. In both these doctrines of *a priori* science Descartes has not been subverted, but, if anything, corroborated by the results of experimental physics; for the so-called atoms of chemical theory already presuppose, from the Cartesian point of view, certain aggregations of the primitive particles of matter. Descartes regards matter as uniform in character,

³ Princp., pt. ii. 37.

throughout the universe; he anticipates, as it were, from his own transcendental ground, the revelations of spectrum analysis as applied to the sun and stars. We have then to think of a full universe of matter (and matter = extension) divided and figured with endless variety, and set (and kept) in motion by God; and any sort of division, figure, and motion will serve the purposes of our supposition as well as another. "Scarcely any supposition,"¹ he says, in ominous language, "can be made from which the same result, though possibly with greater difficulty, might not be deduced by the same laws of nature; for since, in virtue of these laws, matter successively assumes all the forms of which it is capable, if we consider these forms in order, we shall at one point or other reach the existing form of the world, so that no error need here be feared from a false supposition." As the movement of one particle in a closely-packed universe is only possible if all other parts move simultaneously, so that the last in the series steps into the place of the first; and as the figure and division of the particles varies in each point in the universe, there will inevitably at the same instant result throughout the universe an innumerable host of more or less circular movements, and of vortices or whirlpools of material particles, varying in size and velocity. Taking for convenience a limited portion of the universe, we observe that in consequence of the circular movement the particles of matter have their corners pared off by rubbing against each other; and two species of matter thus arise,—one consisting of small globules which continue their circular motion with a (centrifugal) tendency to fly off from the centre as they swing round the axis of rotation, while the other, consisting of the fine dust—the filings and parings of the original particles—gradually becoming finer and finer, and losing its velocity, tends (centripetally) to accumulate in the centre of the vortex, which has been gradually left free by the receding particles of globular matter. This finer matter which collects in the centre of each vortex is the *first* matter of Descartes—it constitutes the sun or star. The spherical particles are the *second* matter of Descartes, and their tendency to propel one another from the centre in straight lines towards the circumference of each vortex is what gives rise to the phenomenon of light radiating from the central star. This second matter is atmosphere or firmament, which envelops and revolves around the central accumulation of first matter.

A third form of matter is produced from the original particles. As the small filings produced by friction seek to pass through the interstices between the rapidly revolving spherical particles in the vortex, they are detained and become twisted and channelled in their passage, and when they reach the edge of the inner ocean of solar dust they settle upon it as the froth and foam produced by the agitation of water gathers upon its surface. These form what we term spots in the sun. In some cases they come and go, or dissolve into an ether round the sun; but in other cases they gradually increase until they form a dense crust round the central nucleus. In course of time the star, with its expansive force diminished, suffers encroachments from the neighbouring vortices, and at length they catch it up. If the velocity of the decaying star be greater than that of any part of the vortex which has swept it up, it will ere long pass out of the range of that vortex, and continue its movement from one to another. Such a star is a comet. But in other cases the encrusted star settles in that portion of the revolving vortex which has a velocity equivalent to its own, and so continues to revolve in the vortex, wrapt in its own firmament. Such a reduced and

¹ Princip., pt. iii. 47.

impoverished star is a planet; and the several planets of our solar system are the several vortices which from time to time have been swept up by the central sun-vortex. The same considerations serve to explain the moon and other satellites. They, too, were once vortices, swallowed up by some other, which at a later day fell a victim to the sweep of our sun.

Such in mere outline is the celebrated theory of vortices, which for about 20 years after its promulgation reigned supreme in science, and for much longer time opposed a tenacious resistance to rival doctrines. It is one of the grandest hypotheses which ever have been formed to account by mechanical processes for the movements of the universe. While chemistry rests in the acceptance of ultimate heterogeneous elements, the vortex-theory assumed uniform matter through the universe, and reduced cosmical physics to the same principles as regulate terrestrial phenomena. It ended the old Aristotelian distinction between the sphere beneath the moon and the starry spaces beyond. It banished the spirits and genii, to which even Kepler had assigned the guardianship of the planetary movements; and, if it supposes the globular particles of the envelope to be the active force in carrying the earth round the sun, we may remember that Newton himself assumed an ether for somewhat similar purposes. The great argument on which the Cartesians founded their opposition to the Newtonian doctrines was that attraction was an occult quality, not wholly intelligible by the aid of mere mechanics. The Newtonian theory is an analysis of the elementary movements which in their combination determine the planetary orbits, and gives the formula of the proportions according to which they act. But the Cartesian theory, like the later speculations of Kant and Laplace, proposes to give a hypothetical explanation of the circumstances and motions which in the normal course of things led to the state of things required by the law of attraction. In the judgment of D'Alembert the Cartesian theory was the best that the observations of the age admitted; and "its explanation of gravity was one of the most ingenious hypotheses which philosophy ever imagined." That the explanation fails in detail is undoubted; it does not account for the ellipticity of the planets; it would place the sun, not in one focus, but in the centre of the ellipse; and it would make gravity directed towards the centre only under the equator. But these defects need not blind us to the fact that this hypothesis made the mathematical progress of Hooke, Borelli, and Newton much more easy and certain. Descartes professedly assumed a simplicity in the phenomena which they did not present. But such a hypothetical simplicity is the necessary step for solving the more complex problems of nature. The danger lies not in forming such hypotheses, but in regarding them as final, or as more than an attempt to throw light upon our observation of the phenomena. In doing what he did, Descartes actually exemplified that reduction of the processes of nature to mere transposition of the particles of matter, which in different ways was a leading idea in the minds of Bacon, Hobbes, and Gassendi. The defects of Descartes lie rather in his apparently imperfect apprehension of the principle of movements uniformly accelerated which his contemporary Galileo had illustrated and insisted upon, and in the indistinctness which attaches to his views of the transmission of motion in cases of impact. In modern times, it may be added, a theory of vortex-atoms has been suggested to explain the constitution of matter. But except in name it has but slight analogy with Cartesian doctrine, and finds a parallel, if anywhere, in a modification of that doctrine by Malebranche.

Besides the last two parts of the *Principles of Philosophy*, the physical writings of Descartes include the *Dioptrics*

and *Meteors*, as well as passages in the letters. His optical investigations are perhaps the subject in which he most contributed to the progress of science; and the lucidity of exposition which marks his *Dioptrics* stands conspicuous even amid the generally luminous style of his works. Its object is a practical one, to determine by scientific considerations the shape of lens best adapted to improve the capabilities of the telescope, which had been invented not long before. The conclusions at which he arrives have not been so useful as he imagined, in consequence of the mechanical difficulties. But the investigation by which he reaches them has the merit of first prominently publishing and establishing the law of the refraction of light. Attempts have been made, principally founded on some jealous remarks of Huyghens, to show that Descartes had learned the principles of refraction from the manuscript of a treatise by Willebrord Snell, but facts do not bear out the charge; and, so far as Descartes founds his optics on any one, it is on the researches of Kepler. In any case the glory of the discovery is to a large extent his own, for his proof of the law is founded upon the theory that light is the tendency or inclination of the subtle particles of ethereal matter to propagate their movement in straight lines from the sun or luminous body to the eye. And thus he approximates to the wave theory of light, though he supposed, like his contemporaries, that the transmission of light was instantaneous. The chief of his other contributions to optics was the explanation of the rainbow—an explanation far from complete, since the unequal refrangibility of the rays of light was yet undiscovered—but a decided advance upon his predecessors, notably on the *De radiis visus et lucis* (1611) of Marc-Antonio de Dominis, archbishop of Spalato, from whom careless critics have assumed that he derived his ideas.

If Descartes had contented himself with thus explaining the phenomena of gravity, heat, magnetism, light, and similar forces by means of the molecular movements of his vortices, even such a theory would have excited admiration by its daring grandeur. But Descartes did not stop short in the region of what is usually termed physics. Chemistry and biology are alike swallowed up in the one science of physics, and reduced to a problem of mechanism. This theory, he believed, would afford an explanation of every phenomenon whatever, and in nearly every department of knowledge he has given specimens of its power. But the most remarkable and daring application of the theory was to account for the phenomena of organic life, especially in animals and man. "If we possessed a thorough knowledge," he says,¹ "of all the parts of the seed of any species of animal (*e.g.*, man), we could from that alone, by reasons entirely mathematical and certain, deduce the whole figure and conformation of each of its members, and, conversely, if we knew several peculiarities of this conformation, we could from these deduce the nature of its seed." The organism in this way is regarded as a machine, constructed from the particles of the seed, which in virtue of the laws of motion have arranged themselves (always under the governing power of God) in the particular animal shape in which we see them. The doctrine of the circulation of the blood, which Descartes adopted from Harvey, supplied additional arguments in favour of his mechanical theory, and he probably did much to popularize the discovery. A fire without light, compared to the heat which gathers in a haystack when the hay has been stored before it was properly dry—heat, in short, as an agitation of the particles—is the motive cause of the contraction and dilatations of the heart. Those finer particles of the blood which become extremely rarefied during this process

¹ Œuvres iv. 494.

pass off in two directions—one portion, and the least important in the theory, to the organs of generation, the other portion to the cavities of the brain. There not merely do they serve to nourish the organ, they also give rise to a fine ethereal flame or wind through the action of the brain upon them, and thus form the so-called "animal" spirits. From the brain these spirits are conveyed through the body by means of the nerves, regarded by Descartes as tubular vessels, resembling the pipes conveying the water of a spring to act upon the mechanical appliances in an artificial fountain. The nerves conduct the animal spirits to act upon the muscles, and in their turn convey the impressions of the organs to the brain.

Man and the animals as thus described are compared to automata, and termed machines. The vegetative and sensitive souls which the Aristotelians had introduced to break the leap between inanimate matter and man are ruthlessly swept away; only one soul, the rational, remains, and that is restricted to man. One hypothesis supplants the various principles of life; the rule of absolute mechanism is as complete in the animal as in the cosmos. Reason and thought, the essential quality of the soul, do not belong to the brutes; there is an impassable gulf fixed between man and the lower animals. The only sure sign of reason is the power of language—*i.e.*, of giving expression to general ideas; and language in that sense is not found save in man. The cries of animals are but the working of the curiously-contrived machine, in which, when one portion is touched in a certain way, the wheels and springs concealed in the interior perform their work, and, it may be, a note supposed to express joy or pain is evolved; but there is no consciousness or feeling. "The animals act naturally and by springs, like a watch."² "The greatest of all the prejudices we have retained from our infancy is that of believing that the beasts think."³ If the beasts can properly be said to see at all, "they see as we do when our mind is distracted and keenly applied elsewhere; the images of outward objects paint themselves on the retina, and possibly even the impressions made in the optic nerves determine our limbs to different movements, but we feel nothing of it all, and move as if we were automata."⁴ I will not believe, said the Cartesian Chanut, that a beast thinks until the beast tells me so itself. The sentence of the animal to the lash of his tyrant is not other than the sensitivity of the plant to the influences of light and heat. It is not much comfort to learn further from Descartes that "he denies life to no animal, but makes it consist in the mere heat of the heart. Nor does he deny them feeling in so far as it depends on the bodily organs."⁵

Descartes, with an unusual fondness for the letter of Scripture, quotes oftener than once in support of this monstrous doctrine the dictum that "The blood is the life;" and he remarks, with some sarcasm possibly, that it is a comfortable theory for the eaters of animal flesh. And the doctrine found acceptance among some whom it enabled to get rid of the difficulties raised by Montaigne and those who allowed more difference between animal and animal than between the higher animals and man. It also encouraged vivisection—a practice common with Descartes himself.⁶ The recluses of Port Royal seized it eagerly, discussed automatism, dissected living animals in order to show to a morbid curiosity the circulation of the blood, were careless of the cries of tortured dogs, and finally embalmed the doctrine in a syllogism of their logic,—No matter thinks; every soul of beast is matter: therefore no soul of beast thinks.

But, whilst all the organic processes in man go on

² Œuvres, ix. 426. ³ Œuvres, vi. 339. ⁴ Œuvres, iv. 452 and 454. ⁵ Œuvres, x. 204. ⁶ Œuvres, x. 208.

mechanically, and though by reflex action he may repel attack unconsciously, still the first affirmation of the system was that man was essentially a thinking being; and, while we retain this original dictum, it must not be supposed that the mind is a mere spectator, or like the boatman in the boat. Of course a unity of nature is impossible between mind and body so described. And yet there is a unity of composition, a unity so close that the compound is "really one and in a sense indivisible." You cannot in the actual man cut soul and body asunder; they interpenetrate in every member. But there is one point in the human frame—a point midway in the brain, single and free, which may in a special sense be called the seat of the mind. This is the so-called conarion, or pineal gland, where in a minimized point the mind on one hand and the vital spirits on the other meet and communicate. In that gland the mystery of creation is concentrated; thought meets extension and directs it; extension moves towards thought and is perceived. Two clear and distinct ideas, it seems, produce an absolute mystery. Mind, driven from the field of extension, erects its last fortress in the pineal gland. In such a state of despair and destitution there is no hope for spiritualism, save in God; and Clauberger, Geulinx, and Malebranche all take refuge under the shadow of His wings to escape the tyranny of extended matter.

In the psychology of Descartes there are two fundamental modes of thought,—perception and volition. "It seems to me," he says, "that in receiving such and such an idea the mind is passive, and that it is active only in volition; that its ideas are put in it partly by the objects which touch the senses, partly by the impressions in the brain, and partly also by the dispositions which have preceded in the mind itself and by the movements of its will."¹ The will, therefore, as being more originitive, has more to do with true or false judgments than the understanding. Unfortunately, Descartes is too lordly a philosopher to explain distinctly what either understanding or will may mean. But we gather that in two directions our reason is bound up with bodily conditions, which make or mar it, according as the will, or central energy of thought, is true to itself or not. In the range of perception, intellect is subjected to the material conditions of sense, memory, and imagination; and in infancy, when the will has allowed itself to assent precipitately to the conjunctions presented to it by these material processes, thought has become filled with obscure ideas. In the moral sphere the passions or emotions (which Descartes reduces to the six primitive forms of admiration, love, hatred, desire, joy, and sadness) are the perceptions or sentiments of the mind, caused and maintained by some movement of the vital spirits, but specially referring to the mind only. The presentation of some object of dread, for example, to the eye has or may have a double effect. On one hand the animal spirits "reflected"² from the image formed on the pineal gland proceed through the nervous tubes to make the muscles turn the back and lift the feet, so as to escape the cause of the terror. Such is the reflex and mechanical movement independent of the mind. But, on the other hand, the vital spirits cause a movement in the gland by which the mind perceives the affection of the organs, learns that something is to be loved or hated, admired or shunned. Such perceptions dispose the mind to pursue what nature dictates as useful. But the estimate of goods and evils which they give is indistinct and unsatisfactory. The office of reason is to give a true and distinct appreciation of the values of goods and evils; or firm and determinate judgments touching the knowledge of good and evil are our proper arms against the influence of the passions.³ We are free, therefore, through knowledge: *ex*

¹ Œuvres, ix. 166. ² Passions de l'Âme, 36. ³ Passions de l'Âme, 43.

magna luce in intellectu sequitur magna propensio in voluntate, and omnis peccans est ignorans. "If we clearly see that what we are doing is wrong, it would be impossible for us to sin, so long as we saw it in that light."⁴ Thus the highest liberty, as distinguished from mere indifference, proceeds from clear and distinct knowledge, and such knowledge can only be attained by firmness and resolution, *i.e.*, by the continued exercise of the will. Thus in the perfection of man, as in the nature of God, will and intellect must be united. For thought, will is as necessary as understanding. And innate ideas therefore are mere capacities or tendencies,—possibilities which apart from the will to think may be regarded as nothing at all.

The philosophy of Descartes fought its first battles and gained its first triumphs in the country of his adoption. In his lifetime his views had been taught in Utrecht and Leyden. In the universities of the Netherlands and of Lower Germany, as yet free from the conservatism of the old-established seats of learning, the new system gained an easy victory over Aristotelianism, and, as it was adapted for lectures and examinations, soon became almost as scholastic as the doctrines it had supplanted. At Leyden, taught by De Raey, Heerebord, Heidan, and Volder; at Utrecht, by De Bruyn and P. Burmann, and Lambert Welthuyzen (the last a private student); at Groningen, by Maresius, Gousset, and Tobias André; at Franeker, by Ruardus Andala; at Breda, Nimeguen, Harderwyk, Duisburg, and Herborn, and at the Catholic university of Louvain, Cartesianism was warmly expounded and defended in seats of learning, of which many are now left desolate, and by adherents whose lucubrations have for the most part long lost interest for any but the antiquary.

The Cartesianism of Holland was a child of the universities, and its literature is mainly composed of commentaries upon the original texts, of theses discussed in the schools, and of systematic expositions of Cartesian philosophy for the benefit of the student. Three names stand out in this Cartesian professoriate,—Wittich, Clauberger, and Geulinx. Wittich (1625–1688), professor at Duisburg and Leyden, is a representative of the moderate followers, who professed to reconcile the doctrines of their school with the faith of Christendom, and to refute the theology of Spinoza. Clauberger (like Wittich, a German), professor of philosophy at Herborn and Duisburg, died while still young in 1665. Like a schoolman on Aristotle, he has, clause by clause, commented upon the *Meditations* of Descartes; but he specially claims notice for his work *De corporis et animæ in homine conjunctio*, where he maintains that the bodily movements are merely procatartic causes (*i.e.*, antecedents, but not strictly causes) of the mental action, and sacrifices the independence of man to the omnipotence of God. The same tendency to absorb all particular causes and movements in God is still more pronounced in Geulinx (1625–1669), who for the last six years of his life taught privately at Leyden. With Geulinx the reciprocal action of mind and body is altogether denied; they resemble two clocks, so made by the artificer as to strike the same hour together. The mind can only act upon itself; beyond that limit, the power of God must intervene to make any seeming interaction possible between body and soul. Such are the half-hearted attempts at consistency in Cartesian thought, which eventually culminated in the pantheism of Spinoza.

Descartes occasionally had not scrupled to interpret the Scriptures according to his own tenets, while still maintaining, when their letter contradicted him, that the Bible was not meant to teach the sciences. Similar tendencies are found amongst his followers. Whilst Protestant

⁴ Œuvres, ix. 170.

opponents put him in the list of atheists like Vanini, and the Catholics held him as dangerous as Luther or Calvin, there were zealous adherents who ventured to prove the theory of vortices in harmony with the book of Genesis. It was this rationalistic treatment of the sacred writings which helped to confound the Cartesians with the allegorical school of John Cocceius, as their liberal doctrines in theology justified the vulgar identification of them with the heresies of Socinian and Arminian. The chief names in this advanced theology connected with Cartesian doctrines are Meyer, the friend and editor of Spinoza, author of a work termed *Philosophia Scripturæ Interpres* (1666); Balthasar Bekker, whose *World Bewitched* helped to discredit the superstitious fancies about the devil; and Spinoza, whose *Tractatus Theologico-Politicus* is in some respects the classical type of rational criticism up to the present day. Against this work and the *Ethics* of Spinoza the orthodox Cartesians (who were in the majority), no less than sceptical hangers-on like Bayle, raised an all but universal howl of reprobation, scarcely broken for about a century.

In France Cartesianism won society and literature before it penetrated into the universities. Clerelier (the friend of Descartes and his literary executor), his son-in-law Rohault (who achieved that relationship through his Cartesianism), and others, opened their houses for readings to which the intellectual world of Paris—its learned professors not more than the courtiers and the fair sex,—flocked to hear the new doctrines explained, and possibly discuss their value. Grand seigneurs, like the prince of Condé, the Duc de Nevers, and the Marquis de Vardes, were glad to vary the monotony of their feudal castles by listening to the eloquent rehearsals of Malebranche or Regis. And the salons of Madame de Sevigné, of her daughter Mme. de Grignan, and of the Duchesse de Maine for a while gave the questions of philosophy a place among the topics of polite society, and furnished to Molière the occasion of his *Femmes Savantes*. The château of the Duc de Luynes, the translator of the *Meditations*, was the home of a Cartesian club, that discussed the questions of automatism and of the composition of the sun from filings and parings, and rivalled Port Royal in its vivisections. The Cardinal de Retz in his leisurely age at Commercy found amusement in presiding at disputations between the more moderate Cartesians and Don Robert Desgabets, who interpreted Descartes in an original way of his own. Though rejected by the Jesuits, who found peripatetic formulae a faithful weapon against the enemies of the church, Cartesianism was warmly adopted by the Oratory, which saw in Descartes something of St Augustine, by Port Royal, which discovered a connection between the new system and Jansenism, and by some amongst the Benedictines and the order of Ste Geneviève.

The popularity which Cartesianism thus gained in the social and literary circles of the capital was largely increased by the labours of Pierre-Sylvain Regis (1632–1707). On his visit to Toulouse in 1665, with a mission from the Cartesian chiefs, his lectures excited boundless interest; ladies threw themselves with zeal and ability into the study of philosophy; and Regis himself, like a public benefactor in some old Greek town, was made the guest of the civic corporation. In 1671 scarcely less enthusiasm was aroused in Montpellier; and in 1680 he opened a course of lectures at Paris, with such acceptance that intending hearers had to secure their seats some time before the lecture began. Regis, by removing the paradoxes and adjusting the metaphysics to the popular powers of apprehension, made Cartesianism popular, and reduced it to a regular system.

But a check was at hand. Descartes, in his correspondence with the Jesuits, had shown an almost cringing eagerness to have their powerful organization on his side

Especially he had written to Père Mesland, one of the order, to show how the Catholic doctrine of the eucharist might be made compatible with his theories of matter. But his undue haste to arrange matters with the church only served to compromise him more deeply. Unwise admirers and malicious opponents exaggerated the theological bearings of his system in this detail; and the efforts of the Jesuits succeeded in getting the works of Descartes, in November 1663, placed upon the Index of prohibited books,—*donec corrigantur*. Thereupon the power of church and state enforced by positive enactments the passive resistance of old institutions to the novel theories. In 1667, the oration at the interment was forbidden by royal order. In 1669, when the chair of philosophy at the Collège Royal fell vacant, one of the four selected candidates had to sustain a thesis against "the pretended new philosophy of Descartes." In 1671 the archbishop of Paris, by the king's order, summoned the heads of the university to his presence, and enjoined them to take stricter measures against philosophical novelties dangerous to the faith. In 1673 a decree of the Parliament against Cartesian and other unlicensed theories was on the point of being issued, and was only checked in time by the appearance of a burlesque mandamus against the intruder Reason, composed by Boileau and some of his brother-poets. Yet in 1675 the university of Angers was empowered to repress all Cartesian teaching within its domain, and actually appointed a commission charged to look for such heresies in the theses and the students' note-books of the college of Anjou belonging to the Oratory. In 1677 the university of Caen adopted not less stringent measures against Cartesianism. And so great was the influence of the Jesuits, that the congregation of St Maur, the canons of Ste Geneviève, and the Oratory laid their official ban on the obnoxious doctrines. From the real or fancied *rapprochements* between Cartesianism and Jansenism, it became for a while impolitic, if not dangerous, to avow too loudly a preference for Cartesian theories. Regis was constrained to hold back for ten years his *System of Philosophy*; and when it did appear, in 1690, the name of Descartes was absent from the title-page. There were other obstacles besides the mild persecutions of the church. Pascal and other members of Port Royal openly expressed their doubts about the place allowed to God in the system; the adherents of Gassendi met it by resuscitating atoms; and the Aristotelians maintained their substantial forms as of old; the Jesuits argued against the arguments for the being of God, and against the theory of innate ideas; whilst Huet, bishop of Avranches, once a Cartesian himself, made a vigorous onslaught on the contempt in which his former comrades held literature and history, and enlarged on the vanity of all human aspirations after rational truth.

The greatest and most original of the French Cartesians was Malebranche. His *Recherche de la Vérité*, in 1674, was the baptism of the system into a theistic religion which borrowed its imagery from Augustine; it brought into prominence the metaphysical base which De la Forge, Rohault, and Regis had neither cared for nor understood. But this doctrine was a criticism and a divergence, no less than a consequence, from the principles in Descartes; and it brought upon Malebranche the opposition, not merely of the Cartesian physicists, but also of Arnauld, Fénelon, and Bossuet, who found, or hoped to find, in the *Meditations*, as properly understood, an ally for theology. Popular enthusiasm, however, was with Malebranche, as twenty years before it had been with Descartes; he was the fashion of the day; and his disciples rapidly increased both in France and abroad.

In 1705 Cartesianism was still subject to prohibitions from the authorities; but in a project of new statutes,