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IV.—THE RELATION OF GREEK PHILOSOPHY TO MODERN THOUGHT.

I.

ADEQUATELY to exhibit the relation of Greek philosophy to modern thought would require a volume. The object of the present discussion is merely to show in what ways that relation has been most clearly manifested, and what assistance it may afford us in solving some important problems connected with the development of metaphysical and moral speculation.

Historians often speak as if philosophy took an entirely fresh start at different epochs of its existence. One such break is variously associated with Descartes, or Bacon, or some one of their Italian predecessors. In like manner, the introduction of Christianity, coupled with the closing of the Athenian schools by Justinian, is considered, as once was the suppression of the West-Roman Cæsarate by Odoacer, to mark the beginning of a new *régime*. But there can be no more a real break in the continuity of intellectual than in the continuity of political history, beyond what sleep or inactivity may simulate in the life of the organic aggregate no less than in the life of the organic individual. In each instance the thread is taken up where it was dropped. If the rest of the world has been advancing meanwhile, new tendencies will come into play, but only by first attaching themselves to older lines of movement. Sometimes, again, what seems to be a revolution is, in truth, the revival or liberation of an earlier movement through the decay or destruction of beliefs which have hitherto checked its growth. Thus the systems of Plato and Aristotle, after carrying all before them for a brief period, were found unsuitable, from their vast comprehension and high spirituality, to the undeveloped consciousness of their age, and were replaced by popularised versions of the sceptical or naturalistic philosophies which they had endeavoured to suppress. And when these were at length left behind by the forward movement of the human mind, speculative reformers spontaneously reverted to the two great Socratic thinkers for a better solution of the problems in debate. After many abortive efforts, a teacher appeared possessing sufficient genius to fuse their principles into a seemingly coherent and comprehensive whole. By combining the Platonic and Aristotelian spiritualism with some mystical elements borrowed from Stoicism, Plotinus did for an age of intellectual decadence what his models had done in vain for an



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Historians often speak as if philosophy took an entirely fresh start at different epochs of its existence. One such break is variously associated with Descartes, or Bacon, or some one of their Italian predecessors. In like manner, the introduction of Christianity, coupled with the closing of the Athenian schools by Justinian, is considered, as once was the suppression of the West-Roman Cæsarate by Odoacer, to mark the beginning of a new *régime*. But there can be no more a real break in the continuity of intellectual than in the continuity of political history, beyond what sleep or inactivity may simulate in the life of the organic aggregate no less than in the life of the organic individual. In each instance the thread is taken up where it was dropped. If the rest of the world has been advancing meanwhile, new tendencies will come into play, but only by first attaching themselves to older lines of movement. Sometimes, again, what seems to be a revolution is, in truth, the revival or liberation of an earlier movement through the decay or destruction of beliefs which have hitherto checked its growth. Thus the systems of Plato and Aristotle, after carrying all before them for a brief period, were found unsuitable, from their vast comprehension and high spirituality, to the undeveloped consciousness of their age, and were replaced by popularised versions of the sceptical or naturalistic philosophies which they had endeavoured to suppress. And when these were at length left behind by the forward movement of the human mind, speculative reformers spontaneously reverted to the two great Socratic thinkers for a better solution of the problems in debate. After many abortive efforts, a teacher appeared possessing sufficient genius to fuse their principles into a seemingly coherent and comprehensive whole. By combining the Platonic and Aristotelian spiritualism with some mystical elements borrowed from Stoicism, Plotinus did for an age of intellectual decadence what his models had done in vain for an

age of intellectual growth. The relation in which he stands to Stoicism and Epicureanism reproduces the relation in which they stood to the various physical and sophistic schools of their time; but the silent experience of six centuries won for him a much more enduring success.

Neo-Platonism was the form under which Greek philosophy passed into Christian teaching; and the transition was effected with less difficulty because Christianity had already absorbed some of its most essential elements from the original system of Plato himself. Meanwhile the revival of spiritualism had given an immense impulse to the study of the classic writings whence it was drawn; and the more they were studied the more prominently did their antagonism on certain important questions come into view. Hence no sooner did the two systems between which Plotinus had established a provisional compromise come out victorious from their struggle with materialism, than they began to separate and draw off into opposing camps. The principal subject of dispute was the form under which ideas exist. The conflicting theories of Realism and Nominalism are already set forth with perfect clearness by Porphyry in his introduction to the *Organon*; and his statement of the case, as Victor Cousin has pointed out, gave the signal for a controversy forming the central interest of Scholasticism during the entire period of its duration. Now, it is a remarkable fact, and one as yet not sufficiently attended to, that a metaphysical issue first raised between the Platonists and Aristotle, and regarded, at least by the latter, as of supreme importance for philosophy, should have been totally neglected at a time when abundant documents on both sides were open to consultation, and taken up with passionate eagerness at a time when not more than one or two dialogues of Plato and two or three tracts of Aristotle continued to be read in the western world. Various explanations of this singular anomaly may be offered. It may be said, for instance, that after every moral and religious question on which the schools of Athens were divided had been closed by the authoritative ruling of Catholicism, nothing remained to quarrel over but points too remote or too obscure for the Church to interfere in their decision; and that these were accordingly seized upon as the only field where human intelligence could exercise itself with any approach to freedom. The truth, however, seems to be that to take any interest in the controversy between Realism and Nominalism, it was first necessary that European thought as a whole should rise to a level with the common standpoint of their first supporters. This revolution was effected by the general adoption of a monotheistic faith. Moreover, the Platonic ideas were something more than figments

of an imaginative dialectic. They were now beginning to appear in their true light, and as what Plato had always understood them to be—no mere abstractions from experience, but spiritual forces by which sensuous reality was to be reconstituted and reformed. The Church herself seemed something more than a collection of individuals holding common convictions and obeying a common discipline; she was, like Plato's own Republic, the visible embodiment of an archetype laid up in Heaven. And the Church's teaching seemed also to assume the independent reality of abstract ideas. Does not the Trinity involve belief in a God distinct from any of the Divine Persons taken alone? Do not the Fall, the Incarnation, and the Atonement become more intelligible if we imagine an ideal humanity sinning with the first Adam and purified by becoming united with the second Adam? Such, at least, seems to have been the dimly conceived metaphysics of St. Paul, whatever may now be the official doctrine of Rome. It was therefore in order that, during the first half of the Middle Ages, from Charlemagne to the Crusades, Realism should have been the prevailing doctrine; the more so because Plato's *Timæus*, which was studied in the schools through that entire period, furnishes its readers with a complete theory of the universe; while only the formal side of Aristotle's philosophy is represented by such of his logical treatises as were then known to Western Christendom.

Yet Realism concealed a danger to orthodoxy which was not long in making itself felt. Just as the substantiality of individuals disappeared in that of their containing species, so also did every subordinate species tend to vanish in the *summum genus* of absolute Being. Now such a conclusion was nothing less than full-blown Pantheism; and Pantheism was, in fact, the system of the first great Schoolman, John Scotus Erigena; while other Realists were only prevented from reaching the same goal by the restraint either of Christian faith or of ecclesiastical authority. But if they failed to draw the logical consequences of their premisses, it was drawn for them by others; and Abélard did not fail to twit his opponents with the formidable heresy implied in their realistic principles.¹ As yet, however, the weight of authority inclined towards Plato's side; and the persecution suffered by Abélard himself, as compared with the very mild treatment accorded to his contemporary, Gilbert de la Porrée, when each was arraigned on a charge of heresy, shows that while the Nominalism of the one was an aggravation, the Realism of the other was an extenuation, of his offence.²

¹ Hauréau, *Histoire de la Philosophie Scolastique*, I. 372.

² For Gilbert de la Porrée see Hauréau, I., chap. xviii.

So matters stood when the introduction of Aristotle's entire system into Western Europe brought about a revolution comparable to that effected two centuries later by the complete recovery of ancient literature. It was through Latin translations from the Arabic, accompanied by Arabic commentaries, that the Peripatetic philosophy was first revealed in its entirety; and even Albertus Magnus, living in the thirteenth century, seems to have derived his knowledge of the subject from these exclusively. But in 1209, a few years after the capture of Constantinople by the Crusaders, the Greek manuscripts of Aristotle were brought to Paris, and towards the middle of the century a new Latin version was made from these under the supervision of St. Thomas Aquinas.¹ The triumph of Aristotle was now, at least for a time, secured. For, while in the first period of the Middle Ages we find only a single great name, that of Abélard, among the Nominalists, against a strong array of Realists, in the second period the proportions are reversed, and Realism has only a single worthy champion, Duns Scotus, to pit against Albertus, Aquinas, and William of Ockham, each of them representing one of the principal European nations. The human intellect, hitherto confined within the narrow bounds of logic, now ranged over physics, metaphysics, psychology, and ethics; and although all these subjects were studied only at second-hand and with very limited opportunities for criticism, still the benefit received must have been immense. The priceless service of the later Schoolmen is to have appropriated and successfully upheld, against Platonism on the one hand and theological mysticism on the other, a philosophy which, however superficial, took in the whole range of natural phenomena, derived all knowledge from external observation, and set an example of admirable precision in the systematic exposition of its results. If no positive addition was made to that vast storehouse of facts and ideas, the blame does not lie with Aristotle's method, but with the forcible suppression of free mental activity by the Church, or its diversion to more profitable fields by the study of Roman jurisprudence. Even as it was, Aristotle contributed largely to the downfall of ecclesiastical authority in two ways; directly by accustoming men to use their reason, and indirectly by throwing back mysticism on its proper office—the restoration of a purely personal religion.

But before the dissolving action of Nominalism had become fully manifest, its ascendancy was once more challenged; and this time, also, the philosophical impulse came from Constantinople. Greek scholars, seeking help in the West, brought with

¹ Jourdain, *Recherches critiques sur les Traductions latines d'Aristote.*

them to Florence the complete works of Plato, and these were shortly made accessible to a wider public through the Latin translation of Ficino. Their influence seems at first to have told in favour of mysticism, for this was the contemporary tendency to which they could be most readily affiliated; and, besides, in swinging back from Aristotle's philosophy to the rival form of spiritualism, men's minds naturally reverted in the first instance to what had once linked them together—the system of Plotinus. Thus Platonism was studied through an Alexandrian medium and as the Alexandrians had looked at it, that is to say, chiefly under its theological and metaphysical aspects. As such it became the accepted philosophy of the Renaissance, and much of what we most admire in the literature—at least the English literature—of that period, is directly traceable to Platonic influence. That the *Utopia* of Sir Thomas More was inspired by the *Republic* and the *Critias* is, of course, obvious; and the great part played by the ideal theory in Spenser's *Faery Queen*, though less evident, is still sufficiently clear. As Mr. Green observes in his *History of the English People* (II. 413), "Spenser borrows, in fact, the delicate and refined forms of the Platonic philosophy to express his own moral enthusiasm. . . . Justice, Temperance, Truth are no mere names to him, but real existences to which his whole nature clings with a rapturous affection." Now it deserves observation, as illustrating a great revolution in European thought, that the relation of Plato to the epic of the English Renaissance is precisely paralleled by the relation of Aristotle to the epic of mediæval Italy. Dante borrows more than his cosmography from the Stagirite. The successive circles of Hell, the spirals of Purgatory, and the spheres of Paradise, are a framework in which the characters of the poem are exhibited, not as individual actors whom we trace through a life's history, but as types of a class and representatives of a single mental quality, whether vicious or virtuous. In other words, the historical arrangement of all previous poems is abandoned in favour of a logical arrangement. For the order of contiguity in time is substituted the order of resemblance and difference in idea. How thoroughly Aristotelian, indeed, were the lines within which mediæval imagination moved is proved by the possibility of tracing them in a work utterly different from Dante's—the *Decameron* of Boccaccio. The tales constituting this collection are so arranged that each day illustrates some one special class of adventures; only, to make good Aristotle's principle that earthly affairs are not subject to invariable rules, a single departure from the prescribed subject is allowed in each decade; while during one

entire day the story-tellers are left free to choose a subject at their own discretion.

Now what distinguishes Spenser from Dante is that, while he also disposes his inventions according to an extremely artificial and abstract schematism, with him, as with Plato, abstractions acquire a separate individual existence, being, in fact, embodied as so many persons; while Dante, following Aristotle, never separates his from the concrete data of experience. And it may be noted that, in this respect at least, English literature has not deserted the philosophy which presided over its second birth. It has ever since been more prone to realise abstraction than any other literature, whether under the form of allegories, parables, or mere casual illustrations drawn from material objects. Even at this day English writers crowd their pages with dazzling metaphors which to Continental readers must have sometimes a rather barbaric effect.

Another and profounder characteristic of Plato, as distinguished from Aristotle, is his thoroughgoing opposition of reality to appearance; his distrust of sensuous perception, imagination, and opinion; his continual appeal to a hidden world of absolute truth and justice. We find this profounder principle also grasped and applied to poetical purposes in our Elizabethan literature, not only by Spenser, but by a still greater master—Shakespeare. It is by no means unlikely that Shakespeare may have looked into a translation of the *Dialogues*; at any rate, the intellectual atmosphere he breathed was so saturated with their spirit that he could easily absorb enough of it to inspire him with the theory of existence which alone gives consistency to his dramatic work from first to last. For the essence of his comedies is that they represent the ordinary world of sensible experience as a scene of bewilderment and delusion, where there is nothing fixed, nothing satisfying, nothing true; as something which, because of its very unreality, is best represented by the drama, though not without mysterious intimations of a reality behind the veil. In them we have the

“ Fallings from us, vanishings,
Blank misgivings of a creature
Moving about in worlds not realised ;”

while in his tragedies we have the realisation of those worlds—the workings of an eternal justice which alone remains faithful to one purpose through the infinite flux of passion and of sense.

Besides the revival of Platonism, three causes had conspired to overthrow the supremacy of Aristotle. The literary Renaissance with its passion for beauty of form was alienated by the barbarous dialect of Scholasticism; the mystical theology of

Luther saw in it an ally both of ecclesiastical authority and of human reason; and the new spirit of passionate revolt against all tradition attacked the accepted philosophy in common with every other branch of the official university curriculum. Before long, however, a reaction set in. The innovators discredited themselves by an extravagance, an ignorance, a credulity, and an intolerance worse than anything in the teaching which they decried. No sooner was the Reformation organised as a positive doctrine than it fell back for support on the only model of systematic thinking at that time to be found. The Humanists were conciliated by having the original text of Aristotle placed before them, and they readily believed, what was not true, that it contained a wisdom which had eluded mediæval research. But the great scientific movement of the sixteenth century contributed, more than any other impulse, to bring about an Aristotelian reaction. After winning immortal triumphs in every branch of art and literature, the Italian intellect threw itself with equal vigour into the investigation of physical phenomena. Here Plato could give little help, whereas Aristotle supplied a methodised description of the whole field to be explored, and contributions of extraordinary value towards the understanding of some at least among its infinite details. And we may measure the renewed popularity of his system not only by the fact that Cesalpinus, the greatest naturalist of the age, professed himself its adherent, but also by the bitterness of the criticisms directed against it, and the involuntary homage offered by rival systems which were little more than meagre excerpts from the Peripatetic ontology and logic.

Of all testimonies to the restored supremacy of Aristotelianism, there is none so remarkable as that afforded by the thinker who, more than any other, has enjoyed the credit of its overthrow. To call Francis Bacon an Aristotelian will seem to most readers a paradox. Such an appellation would, however, be much nearer the truth than were the titles formerly bestowed on the author of the *Novum Organum*. The notion, indeed, that he was in any sense the father of modern science is rapidly disappearing from the creed of educated persons. Its long continuance was due to a coalition of literary men who knew nothing about physics and of physicists who knew nothing about history or philosophy. It is certain that the great discoveries made both before and during Bacon's lifetime were the starting-point of all future progress in the same direction. It is equally certain that Bacon himself had either not heard of those discoveries or that he scornfully rejected them. But it might still be contended that he divined and formulated the only method by which these and all other great additions to human know-

ledge have been made, had not the delusion been dispelled by recent investigations, more especially those of his own editors, Messrs. Ellis and Spedding. Mr. Spedding has shown that Bacon's method, never was applied to physical science at all. Mr. Ellis has shown that it was incapable of application, being founded on a complete misconception of the problem to be solved. The facts could, in truth, have hardly been other than what they are. Had Bacon succeeded in laying down the lines of future investigation, it would have been a telling argument against his own implied belief that all knowledge is derived from experience. For, granting the validity of that belief, a true theory of discovery can only be reached by an induction from the observed facts of scientific practice. It would have been still more extraordinary had he furnished a clue to the labyrinth of nature without ever having explored its mazes on his own account. Even as it is, from Bacon's own point of view the contradiction remains. If ever any system was constructed *a priori* the *Instauratio Magna* was. But there is really no such thing as *a priori* speculation. Apart from observation the keenest and boldest intellect can do no more than rearrange the materials supplied by tradition, or give a higher generalisation to the principles of other philosophers. This was precisely what Bacon did. The wealth of aphoristic wisdom and ingenious illustration scattered through his writings belongs entirely to himself; but his dream of using science as an instrument for acquiring unlimited power over nature is inherited from the astrologers, alchemists, and magicians of the Middle Ages; and his philosophical system, with which alone we are here concerned, is partly a modification, partly an extension, of Aristotle's. An examination of its leading features will at once make this clear.

Bacon begins by demanding that throughout the whole range of experience new facts should be collected on the largest scale, in order to supply materials for scientific generalisation. There can be no doubt that he is here guided by the example of Aristotle, and of Aristotle alone. Such a storehouse of materials is still extant in the *History of Animals*, which evidently suggested the use of the word "History" in this sense to Bacon, and which, by the way, is immensely superior to anything that he ever attempted in the same line. The facts on which Aristotle's *Politics* is based were contained in another vast descriptive work of the same kind, now unhappily lost. Even the Stagirite's more systematic treatises comprise a multitude of observations, catalogued according to a certain order, but not reduced to scientific principles. What Bacon did was to carry out, or to bid others carry out, the plan so suggested in every department

of inquiry. But if we ask by what method he was guided in his survey of the whole field to be explored, how he came by a complete enumeration of the sciences arranged according to their logical order, the answer is still that he borrowed it from the Peripatetic encyclopædia.

One need only compare the catalogue of particular histories subjoined to the *Parasceve*,¹ with a table of Aristotle's works, to understand how closely Bacon follows in the footsteps of his predecessor. We do indeed find sundry subjects enumerated on which the older student had not touched, but they are only such as would naturally suggest themselves to a man of comprehensive intelligence, coming nearly two thousand years after his original; while they are mostly of no philosophical value whatever. Bacon's merit was to bring the distinction between the descriptive sciences and the theoretical sciences into clearer consciousness, and to give a view of the former corresponding in completeness to that already obtained of the latter.

The methodical distinction between the materials for generalisation and generalisation itself, is derived from the metaphysical distinction between Matter and Form in nature.² This distinction is the next great feature of Bacon's philosophy, and it is taken, still more obviously than the first, from Aristotle, the most manifest blots of the original being faithfully reproduced in the copy. The Forms of simple substances were, according to the Stagirite, their sensible qualities. The Forms of aggregates were the whole complex of their differential characteristics. And although the formal cause or idea of a thing was carefully discriminated from its efficient and final causes, it was found impossible in practice to keep the three from running into one. Again, the distinction between single concepts and the judgments created by putting two concepts together, although clearly conveyed by the logical distinction between terms and propositions was no sooner perceived than lost sight of, thanks to the unfortunate theory of essential predication. For it was thought that the import of universal propositions consisted either in stating the total concept to which a given mark belonged, or in annexing a new mark to a given concept. Hence in Aristotle's system the study of natural law means nothing but the definition and classification of natural types; and the whole universe is conceived as an arrangement of concentric spheres, each receiving its impulse from that immediately above

¹ *Works* I. 405 in Ellis & Spedding's Ed.

² "Historia naturalis . . . materia prima philosophiæ." *De Aug.* II. iii.

it. Precisely the same confusion of Form, Cause, and Law reigns throughout Bacon's theory of nature. We do, indeed, find mention made of axiomata or general propositions to a greater extent than in the *Organon*, but they are never clearly distinguished from Forms, nor Forms from functions.¹ And although efficient and material causes are assigned to physics, while formal and final causes are reserved for metaphysics—an apparent recognition of the wide difference between the forces which bring a thing into existence and the actual conditions of its stability,—this arrangement is a departure from the letter rather than from the spirit of Aristotle's philosophy. For the efficient causes of the *De Augmentis* answer roughly to the various kinds of motion discussed in the *Physics* and in the treatise *On Generation and Corruption*; while its Forms are, as we have seen, identified with natural causes or laws in the most general sense.

According to Bacon, the object of science is to analyse the complex of Forms making up an individual aggregate into its separate constituents, the object of art to superinduce one or more such Forms on a given material. Hence his manner of regarding them differs in one important respect from Aristotle's. The Greek naturalist was before all things a biologist. His interest lay with the distinguishing characteristics of animal species. These are easily discovered by the unassisted eye; but while they are comparatively superficial, they are also comparatively unalterable. The English experimenter, being primarily concerned with inorganic bodies, whose properties he desired to utilise for industrial purposes, was led to consider the attributes of an object as at once penetrating its inmost texture, and yet capable of being separated from it. But, like every other thinker of the age, if he escapes from the control of Aristotle it is only to fall under the dominion of another Greek master—in this instance Democritus. Bacon had a great admiration for the Atomists, and although his inveterate Peripatetic proclivities prevented him from embracing their theory as a whole, he went along with it so far as to admit the dependence of the secondary on the primary qualities of matter.

The next step was to create a method for determining the particular configuration on which any given property of matter depends. If such a problem could be solved at all, it would be by some new system of practical analysis. Bacon did not see this because he was a Schoolman, emancipated, indeed, from

¹The "notions and conceptions" of the *Advancement of Learning* (*Works*, III. 356) is rendered by "axiomata" in the *De Augmentis* (I. 567), where in both instances the question is entirely about Forms. Cp. § 8 of Professor Fowler's Introduction to the *Novum Organum*.

ecclesiastical authority but retaining a blind faith in the power of logic. Aristotle's *Organon* had been the great storehouse of aids to verbal disputation; it should now be turned into an instrument for the more successful prosecution of physical researches. What definitions were to the one, that Forms should be to the other; therefore both could be determined by much the same process. Now Aristotle himself had emphatically declared that the concepts out of which propositions are constructed were discoverable by induction and by induction alone. With him, induction meant comparing a number of instances and abstracting the one circumstance, if any, in which they agreed. When the object is to establish a proposition inductively, he has recourse to a method of elimination, and bids us search for instances which, differing in everything else, agree in the association of two particular marks. (*Prior Analyt.* II. xxx.) In the *Topics* he goes still further and supplies us with a variety of tests for ascertaining the relation between a given predicate and a given subject. Among these Mill's Methods of Difference, Residues, and Concomitant Variations are very clearly stated.¹ But he does not call such modes of reasoning Induction. So far as he has any general name for them at all, it is Dialectic, that is Syllogism of which the premisses are not absolutely certain; and as a matter of nomenclature he seems to be right. There is undoubtedly a process by which we arrive at general conclusions from the comparison of particular instances; but this process in its purity is nothing more nor less than induction by simple enumeration. All other reasoning requires the aid of universal propositions, and is therefore, to that extent, deductive. The methods of elimination or, as they are now called, of experiment, involve at every step the assumption of general principles duly specified in that chapter of Mill's *Logic* where they are analysed. And wherever we can rise immediately from a single instance to a general law, it is because the examination of that single instance has been preceded by a chain of deductive reasoning.

The confusion of Induction properly so called and Elimination under a single name is largely due to the bad example set by Bacon. He found it stated in the *Analytics* that all concepts and general propositions are established either by syllogism or by induction; and he found some very useful rules laid down in the *Topics* not answering to what he understood by the

¹ Professor Bain after mentioning that the second book of the *Topics* "sets forth in a crude condition the principal canons of inductive logic," goes on to say that, "these statements cannot be called germs for they never germinated" (Grote's *Minor Works*, p. 14). May they not have germinated in the *Novum Organum*?

former method ; he therefore summarily dubbed them with the name of Induction which they have kept ever since to the incalculable confusion of thought.

In working out his theory of logic, the point on which Bacon lays most stress is the use of negative instances. He seems to think that their application to reasoning is an original discovery of his own. But on examination no more seems to be meant by it than that, before accepting any particular theory, we should consider what other explanations of the same fact might conceivably be offered. In other words, we should follow the example already set by Aristotle and nearly every other Greek philosopher after Socrates. But this is not induction ; it is reasoning down from a disjunctive proposition, generally assumed without any close scrutiny, with the help of sundry conditional propositions, until we reach our conclusion by a sort of exhaustive process. Either this, that, or the other is the explanation of something. But if it were either that or the other, so and so would follow, which is impossible ; therefore it must be this. No other logic is possible in the infancy of inquiry ; but one great advantage of experiment and mathematical analysis is to relieve us from the necessity of employing it.

The value of experimentation as such had, however, scarcely dawned on Bacon. His famous Prerogative Instances are in the main a guide to simple observation, supplemented rather than replaced by direct interference with the phenomena under examination, comparable to that moderate use of the rack which he would have countenanced in criminal procedure. There was perhaps a deeper meaning in Harvey's remark that Bacon wrote about nature like a Lord Chancellor than the great physiologist himself suspected. To Bacon the statesman, science was something to be largely endowed out of the public treasury in the sure hope that it would far more than repay the expenditure incurred by inventions of priceless advantage to human life. To Bacon the lawyer, nature was a person in possession of important secrets to be wrested from her by employing every artifice of the spy, the detective, the cross-examiner, and the inquisitorial judge ; to Bacon the courtier, she was a sovereign whose policy might be discovered, and, if need be, controlled, by paying judicious attention to her humours and caprices. And for this very reason he would feel drawn by a secret affinity to the Aristotelian dialectic, derived as it was through Socrates and Plato from the practice of the Athenian law-courts and the debates of the Athenian assembly. No doubt the *Topics* was intended primarily for a manual of debate rather than of scientific inquiry ; and the English Chancellor showed true philosophic genius in his attempt to utilise it for the latter purpose. Nevertheless the

adaptation proved a mistake. The Socratic dialectic was reserved exclusively by its great founder, and almost exclusively by his successors, for those human interests from the discussion of which it was first derived. And the discoverers, who in Bacon's own lifetime were laying the foundations of physical science, employed a method totally different from his, because they started with a totally different conception of the universe. To them it was not a living whole, a Form of Forms, but a sum of forces to be analysed, isolated and recombined, in fact or in idea, with a sublime disregard for the conditions under which they were presented to ordinary experience. That very extension of human power anticipated by Bacon came in a manner of which he had never dreamed. It was gained by studying, not the Forms to which he attached so much importance, but the modes of motion which he had relegated to a subordinate place in his classification of natural causes.¹

It has been said that, whatever may be the value of his logic,

¹ Descartes showed a much deeper insight into the scientific conditions of industrial progress than Bacon. His words are, "On peut trouver une philosophie pratique par laquelle connoissant la force et les actions du feu, de l'eau, de l'air, des astres, des cieux, et de tous les autres corps qui nous environnent, aussi distinctement que nous connoissons les divers mestiers de nos artisans, nous les pourrions employer en même façon à tous les usages auxquels ils sont propres, et ainsi nous rendre comme maîtres et possesseurs de la Nature." *Discours de la Méthode* Sixième Partie. This passage has been recently quoted by Dr. Bridges ("Comte's Definition of Life," *Fortnightly Review* for June 1881, p. 684) to illustrate what seems a very questionable position. He says that the Copernican astronomy, by revealing the infinitude of the universe, made men despair of comprehending nature in her totality, and thus threw them back on inquiries of more directly human interest and practical applicability; particularly specifying "the lofty utilitarianism of the *Novum Organum* and of the *Discours de la Méthode*," as "one of the first concomitants" "of this intellectual revolution." There seems to be a double misconception here: for, in the first place, Bacon could hardly have been influenced by a theory which he persistently rejected; and in the next place neither Bacon nor Descartes showed a trace of the Positivist tendency to despair of attaining absolute and universal knowledge. Both of them expected to discover the inmost essences of things; and neither of them imagined that a different set of conditions might come into play outside the boundaries of the visible universe. In fact they believed themselves to be enlarging instead of restricting the field of mental vision; and it was from this very enlargement that they anticipated the most momentous practical results. It was with Locke, as we shall see hereafter, that the sceptical or agnostic movement began. In this same article Dr. Bridges repeats, probably on Comte's authority, the incredible statement that "Thales taught the Egyptian priests those two or three elementary truths as to the laws of triangles, which enabled them to tell the height of the pyramid by measuring its shadow." Comte's ignorance or carelessness in relating this story as a well-attested fact was long ago noticed with astonishment by Grote. (*Life of George Grote*, p. 204.)

Bacon recalled men from the construction of baseless theories to the study of facts. But here also he merely echoes Aristotle, who said the same thing long before him, with much greater terseness, and with the superior authority of one who teaches by example as well as by precept; while the merit of reviving Aristotle's advice when it had fallen into oblivion belongs to another Bacon, the author of the *Opus Majus*; the merit of acting on it, to the *savants* of the Renaissance, to such men as Vesalius, Cesalpinus, and Tycho Brahe.

But towards the close of the sixteenth century the time for amassing observations was past, no further progress being possible until the observations already recorded were interpreted aright. The just instinct of science perceived this; and for nearly a century after Cesalpinus no addition of any magnitude was made to what Bacon called "History," while men's conceptions of natural law were undergoing a radical transformation.¹ To choose such a time for developing the Aristotelian philosophy was peculiarly unfortunate; for that philosophy had become, both on its good and on its bad side, an obstacle to progress, by encouraging studies which were not wanted, and by fostering a spirit of opposition to the Copernican astronomy.

The mere fact that Aristotle himself had pronounced in favour of the geocentric system did not count for much. The misfortune was that he had constructed an entire physical philosophy in harmony with it; that he had linked this to his metaphysics; and that the sensible experience on whose authority he laid so much stress, seemed to testify in its favour. The consequence was that those thinkers who, without being professed Aristotelian partisans, still remained profoundly affected by the Peripatetic spirit could not see their way to accepting a theory with which all the hopes of intellectual progress were bound up. These considerations will enable us to understand the attitude of Bacon towards the new astronomy; while, conversely, his position in this respect will serve to confirm the view of his character set forth in the preceding pages. The theory, shared by him with Aristotle, that nature is throughout composed of Form and Matter reached its climax in the supposition that the great elementary bodies are massed together in a series of concentric spheres disposed according to some principle of graduation, symmetry, or contrast; and this seemed incompatible with any but a geocentric arrangement. It is true that Bacon quarrelled with the particular system maintained by Aristotle, and, under

¹ This "Stationary Interval" is noticed by Whewell (*History of the Inductive Sciences*, Bk. XVI., chapter iii., sect. 3), but without determining either its just limits or its real cause.

the guidance of Telesius, fell back on a much cruder form of cosmography; but his mind still remained dominated by the fancied necessity of conceiving the universe under the form of a stratified sphere; and those who persist in looking on him as the apostle of experience will be surprised to find that he treated the subject entirely from an *a priori* point of view. The truth is that Bacon exemplified, in his own intellectual character, every one of the fundamental fallacies which he has so picturesquely described. The unwillingness to analyse sensible appearances into their ideal elements was his Idol of the Tribe; the thirst for material utilities was his Idol of the Cave; the uncritical acceptance of Aristotle's metaphysics, his Idol of the Theatre; and the undefined notions associated with induction, his Idol of the Market.

We may consider it a fortunate circumstance that the philosophy of Form, that is to say, of description, definition, classification, and sensuous perception, as distinguished from mathematical analysis and deductive reasoning, was associated with a demonstrably false cosmology, as it thus became much more thoroughly discredited than would otherwise have been possible. At this juncture the first to perceive and point out how profoundly an acceptance of the Copernican theory must affect men's beliefs about nature and the whole universe, was Giordano Bruno; and this alone would entitle him to a great place in the history of philosophy. The conception of a single finite world surrounded by a series of eternal and unchangeable crystal spheres must, he said, be exchanged for the conception of infinite worlds dispersed through illimitable space. Once grant that the earth has a double movement round its own axis and round the sun, and Aristotle's whole system of finite existence collapses at once, leaving the ground clear for an entirely different order of ideas.¹ But in this respect whatever was established by the new science had already been divined by a still older philosophy than Aristotle's, as Bruno himself gladly acknowledged,² and the immediate effect of his reasoning was to revive the Atomic theory. The assumption of infinite space, formerly considered an insuperable objection to that theory, now became one of its chief recommendations; the arguments of Lucretius regained their full force, while his fallacies were let drop; Atomism seemed not only possible but necessary; and the materialism once associated with it was equally revived. But

¹ *Compreso che sarà il moto di quest' astro mondano in cui siamo . . . s'aprirà la porta de l'intelligenza de li principj veri di cose naturali. De l'Infinito Universo e Mondi*, p. 51, Wagner's Ed.

² "Sono amputate radici che germogliano, son cose antiche che rivegnono." *Ib.*, p. 82.

Aristotelianism, as we have seen, was not alone in the field, and on the first symptoms of a successful revolt its old rival stood in readiness to seize the vacant throne. The question was how far its claim would be supported, and how far disputed by the new invaders. It might be supposed that the older forms of Greek philosophy, thus restored to light after an eclipse of more than a thousand years, would be not less hostile to the poetic Platonism than to the scientific Aristotelianism of the Renaissance. Such, however, was not the case; and we have to show how an alliance was established between these apparently opposite lines of thought, eventually giving birth to the highest speculation of the following century.

Bruno himself acted as a mediator between the two philosophies. His sympathies with Platonism were strongly pronounced, he looked with admiration on its mediæval supporters, especially David of Dinan; and regretted the time when Oxford was a focus of realistic teaching, instead of being what he found her, devoted to the pedantic humanism of the Renaissance.¹ He fully accepted the pantheistic conclusions towards which Platonism always tended; but in proclaiming an absolute principle whence all specific differences are evolved, he is careful to show that, while it is neither Form nor Matter in the ordinary sense, it may be called Matter in the more refined signification attached to that term by Plotinus and indeed by Aristotle himself. There is a common substance underlying all abstract essences, just as there is a common substance left behind when the sensible qualities of different bodies are stripped off; and both are at bottom the same. Thus Monism became the banner round which the older forms of Greek speculation rallied in their assault on Aristotle's philosophy, though what it meant was as yet very imperfectly understood.

Meanwhile a new and powerful agency was about to interpose with decisive effect in the doubtful struggle. This was the study of mathematics. Revived by the Arabians and never wholly neglected during the Middle Ages, it had profited by the general movement of the Renaissance, and was finally applied to the cosmical problem by Galileo. In this connexion two points of profound philosophical interest must be noted. The first is that, even in its fall, the Aristotelian influence survived, to some extent, both for good and for evil. To Aristotle belongs the merit of having been the first to base astronomy on physics. He maintains the earth's immobility on experimental no less than on speculative grounds. A stone thrown straight up in

¹ *Principio Causa et Uno*, p. 225. For David of Dinan, whose opinions are known only through the reports of Albertus and Aquinas, see Hauréau, II., iv.

the air returns to its starting point instead of falling to the west of it; and the absence of stellar parallax seems to show that there is no change in our position relatively to the heavenly bodies. After satisfying himself on empirical considerations that the popular astronomy is true, he proceeds to show that it must be true by considerations on the nature of matter and motion, which, although mistaken, are conceived in a genuinely scientific spirit. Now Galileo saw that, to establish the Copernican system, he must first grapple with the Peripatetic metaphysics, and replace them by a new dynamical theory. This, which he could hardly have effected by the ordinary mathematical methods, he did by borrowing the analytical method of Atomism and applying it to the measurement of motion. The law of falling bodies was ascertained by resolving their descent into a series of moments, and determining its rate of velocity at successive intervals; and curvilinear motions were similarly resolved into the combination of an impulsive with an accelerating force, a method diametrically opposed to that of Bacon who would not even accept the rough analysis of the apparent celestial motions proposed by Greek astronomers.

It seems strange that Galileo, having gone so far, did not go a step further and perceive that the planetary orbits, being curvilinear, must result from the combination of a centripetal with a tangential force. But the truth is that he never seems to have grasped his own law of inertia in its full generality. He understood that the planets could not have been set in motion without a rectilinear impulse; but his idea was that it continued only so long as was necessary, in order to give them their present velocity instead of acting on them for ever as a tangential force. The explanation of this strange inconsequence must be sought in a survival of Aristotelian conceptions, in the persistent belief that rectilinear motion was necessarily limited and temporary, while circular movement was natural, perfect and eternal.¹ Now such conceptions as nature, perfection, and eternity always rebel against an analysis of the phenomena wherein they are supposed to reside. The same prejudice will explain why Galileo should have so persistently ignored Kepler's Laws, for we can hardly imagine that they were not brought under his notice.

The philosophical affinities of the new science were not exhausted by the atomistic analysis of Democritus and the regulative method of Aristotle. Platonism could hardly fail to

¹ Galileo's words are:—"Il moto circolare è naturale del tutto e delle parti mentre sono in ottima disposizione." *Dialoghi sui Massimi Sistemi. Opere*, Vol I. p. 265; see also p. 38.

benefit by the great impulse given to mathematical studies in the latter half of the sixteenth century. The passionate love of its founder for geometry must have recommended him as much to the most advanced minds of the period as his religious mysticism had recommended him to the theologians of the earlier Renaissance. And the increasing ascendancy of the heliocentric astronomy with its splendid defiance of sense and opinion was indirectly a triumph for the philosophy which, more than any other, had asserted the claims of pure reason against both. We see this distinctly in Galileo. In express adhesion to Platonism, he throws his teaching into a conversational form, endeavouring to extract the truth from his opponents rather than convey it into their minds from without; and the theory of reminiscence as the source of demonstrative knowledge seems to meet with his approval.¹ He is always ready with proofs drawn from observation and experiment; but nothing can be more in Plato's spirit, nothing more unlike Aristotle and Bacon, than his encomium on the sublime genius of Aristarchus and Copernicus for having maintained a rational hypothesis against what seemed to be the evidence of their senses.² And he elsewhere observes how much less would have been the glory of Copernicus had he known the experimental verification of his theory.³

The Platonic influence told even more efficaciously on Galileo's still greater contemporary Kepler. With him, as with the author of the *Republic*, mysticism took the direction of seeking everywhere for evidence of mathematical proportions. With what brilliant success the search was attended, it is needless to relate. What interests us here is the fact vouched for by Arago, that the German astronomer was guided by an idea of Plato's, that the world must have been created on geometrical principles.⁴ Had Bacon known anything about the work on which his adventurous contemporary was engaged, we may be sure that it would have afforded him another illustration for his *Idôla*, the only difficulty being whether it should be referred to the illusions of the Tribe, the Den, or the Theatre.

Meanwhile Atomism continued to exercise a powerful influ-

¹ *Dialoghi*, p. 211.

² "Non posso trovar termine all' ammirazione mia come abbia possuto in Aristarco e nel Copernico far la ragione tanta violenza al senso che contro a questo ella si sia fatta padrona della loro credulità." *Dialoghi*, p. 358.

³ *Ib.*, p. 370.

⁴ "Kepler était persuadé de l'existence de ces lois en suivant cette pensée de Platon : que Dieu, en créant le monde, avait dû faire de la géométrie." Arago, *Œuvres* III., 212.

ence on the method even more than on the doctrines of science. The analytical mode of treatment, applied by Galileo to dynamics, was applied, with equal success, by other mathematicians, to the study of discrete and continuous quantity. It is to the division of numbers and figures into infinitesimal parts—a direct contravention of Aristotle's teaching,—that we owe logarithms, algebraic geometry, and the differential calculus. Thus was established a connexion between spiritualism and materialism, the philosophy of Plato and the philosophy of Democritus. Out of these elements together with what still survived of Aristotelianism was constructed the system of Descartes.

To understand Descartes aright we must provisionally disregard the account given in his work on *Method* of the process by which he arrived at a new theory of the world; for, in truth, there was nothing new about it except the proportion in which fragments taken from older systems were selected and recombined. As we have already noticed, there is no such thing as spinning philosophies out of one's own head; and in Descartes' case even the belief that he was so doing came to him from Plato; for along with Aristotle's dogmatic errors his sound teaching with regard to the derivation of knowledge had fallen into oblivion. The initial doubt of the *Discourse on Method* and the *Meditations* is also Platonic; only it is manifested under an individual and subjective, instead of a universal and objective form. But to find the real starting-point of Descartes' inquiries we must look for it in his mathematical studies. A geometrician naturally conceives the visible world under the aspect of figured extension; and if he thinks the figures away, nothing will remain but extension as the ultimate material out of which all determinate bodies are shaped. Such was the result reached by Plato in his *Timæus*. He identified matter with space, viewing this as the receptacle for his eternal and self-existent Ideas, or rather the plastic medium on which their images are impressed. The simplest spatial elements are triangles; accordingly it is with these that he constructs his solid bodies. The theory of triangular elements was probably suggested by Atomism; it is, in fact, a compromise between the purely mathematical and the materialistic methods. Like all Plato's fancies, this theory of matter was attacked with such convincing arguments by Aristotle that, so long as his physics remained in the ascendant, it did not find a single supporter. Even now, at the moment of his fall, it might have failed to attract attention had not the conditions under which it first arose been almost exactly repeated. Geometrical demonstration had again become the type of all reasoning; there was again a

sceptical spirit abroad forcing men to fall back on the most elementary and universal conceptions; an atomistic materialism again threatened to claim at least the whole field of physical inquiry for its own. That Descartes followed the *Timæus* in identifying matter with extension cannot be doubted; especially when we see that he adopts Plato's analysis of body into elementary triangles; but the theory agreed so well with his intellectual predispositions that he may easily have imagined it to be a necessary deduction from his own *a priori* ideas. Moreover, after the first two steps, he parts company with Plato, and gives himself up, so far as his rejection of a vacuum will permit, to the mechanical physics of Democritus. Much praise has recently been bestowed on his attempt to interpret all physical phenomena in terms of matter and motion, and to deduce them from the unaided operation of natural causes; but this is no more than had been done by the early Greek thinkers, from whom, we may observe, his hypothesis of an initial vortex was also derived. His cosmogony is better than theirs, only in so far as it is adapted to scientific discoveries in astronomy and physiology not made by Descartes himself; for where his conjectures go beyond these they are entirely at fault.

Descartes' theory of the universe included, however, something more than extension (or matter) and motion. If we ask whence this something more came, our philosopher will answer that it was obtained by looking into himself. It was, in reality, obtained by looking into Aristotle. To understand this, we must once more turn to the *Timæus*. Plato made up his universe from space and Ideas. But the Ideas were too vague or too unintelligible for scientific purposes. Even mediæval Realists were content to replace them by Aristotle's much clearer doctrine of Forms. On the other hand, Aristotle's First Matter was anything but a satisfactory conception. It was a mere abstraction; the unknowable residuum left behind when bodies were stripped, in imagination, of all their sensible and cogitable qualities. In other words, there was no matter actually existing without form; whereas form was never so truly itself, never so absolutely existent, as when completely separated from matter: it then became simple self-consciousness, as in God, or the reasonable part of the human soul. The revolution wrought by substituting space for Aristotle's First Matter will now become apparent. Corporeal substance could at once be conceived as existing without the co-operation of Form; and at the same stroke, Form, liberated from its material bonds, sprang back into the subjective sphere to live henceforward only as pure self-conscious thought.

This absolute separation of Form and Matter, under their new names of Thought and Extension, once grasped, various principles of Cartesianism will follow from it by logical necessity. First comes the exclusion of final causes from philosophy, or rather from nature. There was not, as with Epicurus, any anti-theological feeling concerned in their rejection. With Aristotle, against whom Descartes is always protesting, the final cause was not a mark of designing intelligence imposed on matter from without; it was only a particular aspect of Form, the realisation of what Matter was always striving after by virtue of its inherent potentiality. When Form was conceived only as pure thought there could be no question of such a process; the most highly organised bodies being only modes of figured extension. The revival of Atomism had, no doubt, a great deal to do with this result. Aristotle had himself shown with masterly clearness the difference between his view of nature and that taken by Democritus; thus indicating beforehand the direction in which an alternative to his own teaching might be sought; and Bacon had, in fact, already referred with approval to the example set by Democritus in dealing with teleological inquiries. Nevertheless Bacon's own attitude towards final causes differs essentially from Descartes'. The French mathematician, had he spoken his whole mind, would probably have denied their existence altogether. The English reformer fully admits their reality, as, with his Aristotelian theory of Forms, he could hardly avoid doing; and we find that he actually associates the study of final with that of formal causes, assigning both to metaphysics as its peculiar province. This being so, his comparative neglect of the former is most easily explained by the famous comparison of teleological inquiries to vestal virgins, dedicated to the service of God and bearing no offspring; for Mr. Ellis has made it perfectly clear that the barrenness alluded to is not scientific but industrial. Our knowledge is extended when we trace the workings of a divine purpose in nature; but it is not a kind of knowledge which bears fruit in useful mechanical inventions.¹ Bacon probably felt that men would not be very forward to improve on nature if they believed in the perfection of her works and in their beneficent adaptation to our wants. The teleological spirit was as strong with him as with Aristotle, but it took a different direction. Instead of studying the adaptation of means to ends where it already existed, he wished men to create it for themselves. But the utilitarian tendency, which predominated with Bacon, was quite exceptional with Descartes. Speaking generally, he desired

¹ *De Aug.* III. v. *Works* I. 571.

knowledge for its own sake, not as an instrument for the gratification of other wants; and this intellectual disinterestedness was perhaps another aspect of the severance effected between thought and matter.

The celebrated Cartesian paradox that animals are unconscious automata is another consequence of the same principle. In Aristotle's philosophy, the doctrine of potentiality developing itself into act through a series of ascending manifestations, supplied a link connecting the highest rational with the lowest vegetal life. The identification of Form with pure thought put an end to the conception of any such intermediate gradations. Brutes must either have a mind like ours or none at all. The former alternative was not even taken into consideration; probably, among other reasons, because it was not easily reconcilable with Christianity; so that nothing remained but to deny sensibility where thought was believed not to exist.

Finally, in man himself thought is not distinguished from feeling; it is, in fact, the essence of mind, just as extension is the essence of body; and all spiritual phenomena are modes of thought in the same sense that all physical phenomena are modes of space. It was then rather a happy chance than genuine physiological insight which led Descartes to make brain the organ of feeling no less than of intellection; a view, as Professor Huxley has observed, much in advance of that held by Bichat a hundred and fifty years later. For whoever deduced all the mental manifestations from a common essence was bound in consistency to locate them in the same bodily organ; what the metaphysician had joined the physiologist could not possibly put asunder.

We are now in a position to understand the full force of Descartes' *Cogito ergo sum*. It expresses the substantiality of self-conscious Form, the equal claim of thought with extension to be recognised as an element of the universe. This recognition of self-consciousness as the surest reality was, indeed, far from being new. The Greek sceptics had never gone to the length of doubting their own personal existence. On the contrary, they professed a sort of subjective idealism. Refusing to go beyond their own consciousness, they found in its undisturbed self-possession the only absolute satisfaction that life could afford. But knowledge and reality had become so intimately associated with something independent of mind, and mind itself with a mere reflection of reality, that the denial of an external world seemed to the vulgar a denial of existence itself. And although Aristotle had found the highest, if not the sole absolute, actuality in self-thinking thought, he projected it to such a distance from human personality that its bearing on

the sceptical controversy had passed unperceived. Descartes began his demonstration at the point where all the ancient systems had converged, but failed to discover in what direction the conditions of the problem required that they should be prolonged. No mistake can be greater than to regard him as the precursor of German philosophy. The latter originated quite independently of his teaching, though not perhaps of his example, in the combination of a much profounder scepticism with a much wider knowledge of dogmatic metaphysics. His method is the very reverse of true idealism. The *Cogito ergo sum* is not a taking up of existence into thought, but rather a conversion of thought into one particular type of existence. Now, as we have seen, all other existence was conceived as extension, and however carefully thought might be distinguished from this as absolutely indivisible, it was speedily reduced to the same general pattern of inclusion, limitation, and expansion. Whereas Kant, Fichte, and Hegel afterwards dwelt on the form of thought, Descartes attended only to its content or to that in which it was contained. In other words, he began by considering not *how* he thought but *what* he thought and *whence* it came—his ideas and their supposed derivation from a higher sphere. Here again the Platonic tendency is apparent. Having rejected the later Schoolmen, instead of making an advance on their teaching, he fell back on the realistic fancies of the earlier Schoolmen, especially St. Anselm. The mediæval doctor had inferred the existence of a supreme being (*quo nihil majus cogitari potest*) from the idea of such a being, through a quantitative comparison of the two, than which nothing more frankly materialistic can be conceived. Descartes, following on the same track, seeks, with still blinder confusion, to infer existence from the idea of perfection, just as the properties of a triangle are inferred from its definition, or again by assuming that the dynamical equivalence of a mechanical effect to its cause must obtain in a world where spatial relations and therefore measurement are presumably unknown. Such fallacies were impossible so long as Aristotle's logic continued to be carefully studied, and they gradually disappeared with its revival. Meanwhile the cat was away and the mice used their opportunity.

That the absolute disjunction of thought from matter involved the impossibility of their interaction was a consequence not drawn by Descartes himself but by his immediate followers. Here also Greek philosophy played its part in hastening the development of modern ideas. The fall of Aristotle had incidentally the effect of reviving not only the systems which preceded, but also those which followed his. Chief among

these were Stoicism and Epicureanism. Differing widely in most other respects, they agreed in teaching that body is acted on by body alone. The Cartesians accepted this principle to the fullest extent so far as human perceptions and volitions were concerned; and to a great extent in dealing with the problems of physical science. But instead of arguing from the laws of mechanical causation to the materiality of mind, they argued from its immateriality to the total absence of communication between consciousness and motion. There was, however, one thinker of that age who went all lengths with the later Greek materialists. This was Thomas Hobbes. But the influence of ancient ideas on his theories and on those of his successors, down to the time when it becomes indistinguishably mingled with other elements, must be reserved for a second and concluding paper.

ALFRED W. BENN.