

Baconian method, and that in which the author took most pride, the process of exclusion or rejection. This elimination of the non-essential, grounded on the fundamental propositions with regard to forms, is the most important of Bacon's contributions to the logic of induction, and that in which, as he repeatedly says, his method differs from all previous philosophies. It is evident that if the tables were complete, and our notions of the respective phenomena clear, the process of exclusion would be a merely mechanical counting out, and would infallibly lead to the detection of the cause or form. But it is just as evident that these conditions can never be adequately fulfilled. Bacon saw that his method was impracticable (though he seems to have thought the difficulties not insuperable), and therefore set to work to devise new helps, *adminicula*. These he enumerates in ii., *Aph.* 21:—*Prerogative Instances, Supports of Induction, Rectification of Induction, Varying the Investigation according to the Nature of the Subject, Prerogative Natures, Limits of Investigation, Application to Practice, Preparations for Investigation, the Ascending and Descending Scale of Axioms.* The remainder of the *Organum* is devoted to a consideration of the twenty-seven classes of Prerogative Instances, and, though it contains much that is both luminous and helpful, it adds little to our knowledge of what constitutes the Baconian method. On the other heads we have but a few scattered hints. But although the rigorous requirements of science could only be fulfilled by the employment of all these means, yet in their absence it was permissible to draw from the tables and the exclusion an hypothetical conclusion, the truth of which might be verified by the use of the other processes; such an hypothesis is called fantastically the First Vintage (*Vindemiatio*). The inductive method, so far as exhibited in the *Organum*, is exemplified by an investigation into the nature of heat.

Such was the method devised by Bacon, and to which he ascribed the qualities of absolute certainty and mechanical simplicity. But even supposing that this method were accurate and completely unfolded, it is evident that it could only be made applicable and produce fruit when the phenomena of the universe have been very completely tabulated and arranged. In this demand for a complete natural history, Bacon also felt that he was original, and he was deeply impressed with the necessity for it; in fact, he seems occasionally to place an even higher value upon it than upon his *Organum*. Thus, in the preface to his series of works forming the third part of the *Instauratio*, he says: "It comes, therefore, to this, that my *Organum*, even if it were completed, would not without the *Natural History* much advance the *Instauratio of the Sciences*, whereas the *Natural History* without the *Organum* would advance it not a little."² But a complete natural history is evidently a thing impossible, and in fact a history can only be collected by attending to the requirements of the *Organum*. This was seen by Bacon, and what may be regarded as his final opinion on the question is given in the important letter to Baranzano:—"With regard to the multitude of instances by which men may be deterred from the attempt, here is my answer. First, what need to dissemble? Either store of instances must be procured, or the business must be given up. All other ways, however enticing, are impassable. Secondly, the prerogatives of instances, and the mode of experimenting upon experiments of light (which I shall hereafter explain), will diminish the multitude of them very much. Thirdly, what matter, I ask, if the description of the instances should fill six times as many volumes as Pliny's *History*? . . . For the true

¹ *Distrib. Op.* (*Works*, iv. 28); *Parascove* (*ibid.*, 251, 252, 255-256); *Descrip. Glob. Intel.*, ch. 3.

² *Works*, ii. 16; cf. *N. O.*, i. 130.

natural history is to take nothing except instances, connections, observations, and canons."³ The *Organum* and the *History* are thus correlative, and form the two equally necessary sides of a true philosophy; by their union the new philosophy is produced.

Two questions may be put to any doctrine which professes to effect a radical change in philosophy or science. Is it original? Is it valuable? With regard to the first, it has been already pointed out that Bacon's induction or inductive method is distinctly his own, though it cannot and need not be maintained that the general spirit of his philosophy was entirely new.

The value of the method is a separate and more difficult question. It has been assailed on the most opposite grounds. Macaulay, while admitting the accuracy of the process, denied its efficiency, on the ground that an operation performed naturally was not rendered more easy or efficacious by being subjected to analysis.⁴ This objection is curious when confronted with Bacon's reiterated assertion that the natural method pursued by the unassisted human reason is distinctly opposed to his; and it is besides an argument that tells so strongly against many sciences, as to be comparatively worthless when applied to any one. There are, however, more formidable objections against the method. It has been pointed out,⁵ and with perfect justice, that science in its progress has not followed the Baconian method; that no one discovery can be pointed to which can be definitely ascribed to the use of his rules, and that men the most celebrated for their scientific acquirements, while paying homage to the name of Bacon, practically set at naught his most cherished precepts. The reason of this is not far to seek, and has been pointed out by logicians of the most diametrically opposed schools. The mechanical character both of the natural history and of the logical method applied to it, resulted necessarily from Bacon's radically false conception of the nature of cause and of the causal relation. The whole logical or scientific problem is treated as if it were one of co-existence, to which in truth the method of exclusion is scarcely applicable, and the assumption is constantly made that each phenomenon has one and only one cause.⁶ The inductive formation of axioms by a gradually ascending scale is a route which no science has ever followed, and by which no science could ever make progress. The true scientific procedure is by hypothesis followed up and tested by verification; the most powerful instrument is the deductive method, which Bacon can hardly be said to have recognised. The power of framing

³ *Letters and Life*, vii. 377.

⁴ Compare what Bacon says, *N. O.*, i. 130.

⁵ Brewster, *Life of Newton*, 1855 (see particularly vol. ii. 403, 405); Lasson, *Ueber Bacon von Verulam's wissenschaftliche Principien*, 1860; Liebig, *Ueber Francis Bacon von Verulam, &c.*, 1863 (a translation of the last appeared in *Macmillan's Magazine* for July and August 1863). Although Liebig points out how little science proceeds according to Bacon's rules, yet his other criticisms seem of extremely little value. In a very offensive and quite unjustifiable tone, which is severely commented on by Sigwart and Fischer, he attacks the Baconian methods and its results. These results he claims to find in the *Sylva Sylvarum*, entirely ignoring what Bacon himself has said of the nature of that work (*N. O.*, i. 117; cf. Rawley's Pref. to the *S. S.*), and thus putting a false interpretation on the experiments there noted. It is not surprising that he should detect many flaws, but he never fails to exaggerate an error, and seems sometimes completely to miss the point of what Bacon says. (See particularly his remarks on *S. S.*, 33, 336.) The method he explains in such a way as to show he has not a glimpse of its true nature. He brings against Bacon, of all men, the accusations of making induction start from the undetermined perceptions of the senses, of using imagination, and of putting a quite arbitrary interpretation on phenomena. He crowns his criticism by expounding what he considers to be the true scientific method, which, as has been pointed out by Fischer, is simply that Baconian doctrine against which his attack ought to have been directed. (See his account of the method, *Ueber Bacon*, 47-49; K. Fischer, *Bacon*, p. 499-502.)

⁶ Mill, *Logic*, ii. pp. 115, 116, 329, 330.

hypotheses points to another want in the Baconian doctrine. If that power form part of the true method, then the mind is not wholly passive or recipient; it anticipates nature, and moulds the experience received by it in accordance with its own constructive ideas or conceptions; and yet further, the minds of various investigators can never be reduced to the same dead mechanical level.¹ There will still be room for the scientific use of the imagination, and for the creative flashes of genius.²

If, then, Bacon himself made no contributions to science, if no discovery can be shown to be due to the use of his rules, if his method be logically defective, and the problem to which it was applied one from its nature incapable of adequate solution, it may not unreasonably be asked, How has he come to be looked upon as the great leader in the reformation of modern science? How is it that he shares with Descartes the honour of inaugurating modern philosophy? To this the true answer seems to be, that Bacon owes his position not only to the general spirit of his philosophy, but to the manner in which he worked into a connected system the new mode of thinking, and to the incomparable power and eloquence with which he expounded and enforced it. Like all epoch-making works, the *Novum Organum* gave expression to ideas which were already beginning to be in the air. The time was ripe for a great change; scholasticism, long decaying, had begun

¹ Whewell, *Phil. of Ind. Sc.*, ii. 399, 402-3; Ellis, *Int. to Bacon's Works*, i. 39, 61; Brewster, *Newton*, ii. 404; Jevons, *Princ. of Science*, ii. 220. A severe judgment on Bacon's method is given in Dühring's able but one-sided *Kritische Gesch. d. Phil.*, in which the merits of Roger Bacon are brought prominently forward.

² Although it must be admitted that the Baconian method is fairly open to the above-mentioned objections, it is curious and significant that Bacon was not thoroughly ignorant of them, but with deliberate consciousness preferred his own method. We do not think, indeed, that the notions of which he speaks in any way correspond to what Whewell and Ellis would call "conceptions or ideas furnished by the mind of the thinker;" nor do we imagine that Bacon would have admitted these as necessary elements in the inductive process. But he was certainly not ignorant of what may be called a deductive method, and of a kind of hypothesis. This is clear from the use he makes of the *Vindemiatio*, from certain hints as to the testing of axioms, from his admission of the syllogism into physical reasoning, and from what he calls *Experientia Literata*. The function of the *Vindemiatio* has been already pointed out; with regard to axioms, he says (*N. O.*, i. 106), "In establishing axioms by this kind of induction, we must also examine and try whether the axiom so established be framed to the measure of these particulars from which it is derived, or whether it be larger or wider. And if it be larger and wider, we must observe whether, by indicating to us new particulars, it confirm that wideness and largeness as by a collateral security, that we may not either stick fast in things already known, or loosely grasp at shadows and abstract forms, not at things solid and realised in matter." (Cf. also the passage from *Valerius Terminus*, quoted in Ellis's note on the above aphorism.) Of the syllogism he says, "I do not propose to give up the syllogism altogether. S. is incompetent for the principal things rather than useless for the generality. In the mathematics there is no reason why it should not be employed. It is the flux of matter and the inconstancy of the physical body which requires induction, that thereby it may be fixed as it were, and allow the formation of notions well defined. In physics you wisely note, and therein I agree with you, that after the notions of the first class and the axioms concerning them have been by induction well made out and defined, syllogism may be applied safely; only it must be restrained from leaping at once to the most general notions, and progress must be made through a fit succession of steps."—"Letter to Baranzano," *Letters and Life*, vii. 377.) And with this may be compared what he says of mathematics (*Nov. Org.*, ii. 8; *Parascove*, vii.) In his account of *Experientia Literata* (*De Aug.*, v. 2) he comes very near to the modern mode of experimental research. It is, he says, the procedure from one experiment to another, and is not a science, but an art or learned sagacity (resembling in this Aristotle's ἀγχινοία), which may, however, be enlightened by the precepts of the *Interpretatio*. Eight varieties of such experiments are enumerated, and a comparison is drawn between this and the inductive method; "though the rational method of inquiry by the *Organum* promises far greater things in the end, yet this sagacity, proceeding by learned experience, will in the meantime present mankind with a number of inventions which lie near at hand." (*Cf. N. O.*, i. 103.)

to fall; the authority not only of school doctrines but of the church had been discarded; while here and there a few devoted experimenters were turning with fresh zeal to the unwithered face of nature. The fruitful thoughts which lay under and gave rise to these scattered efforts of the human mind, were gathered up into unity, and reduced to system in the new philosophy of Bacon.³ It is assuredly little matter for wonder that this philosophy should contain much that is now inapplicable, and that in many respects it should be vitiated by radical errors. The details of the logical method on which its author laid the greatest stress have not been found of practical service;⁴ yet the fundamental ideas on which the theory rested, the need for rejecting rash generalisation, and the necessity for a critical analysis of experience, are as true and valuable now as they were then. Progress in scientific discovery is made mainly, if not solely, by the employment of hypothesis, and for that no code of rules can be laid down such as Bacon had devised. Yet the framing of hypothesis is no mere random guess work; it is not left to the imagination alone, but to the scientific imagination. There is required in the process not merely a preliminary critical induction, but a subsequent experimental comparison, verification, or proof, the canons of which can be laid down with precision. To formulate and show grounds for these laws is to construct a philosophy of induction, and it must not be forgotten that the first step towards the accomplishment of the task was made by Bacon, when he introduced and gave due prominence to the powerful logical instrument of exclusion or elimination.

Of the general characteristics of Bacon's philosophy, and of the consequent place he holds in the history of modern speculative thought, this is not the place to speak. It is curious and significant that in the domain of the moral and metaphysical sciences his influence has been perhaps more powerful, and his authority has been more frequently appealed to, than in that of the physical. This is due, not so much to his expressed opinion that the inductive method was applicable to all the sciences,⁵ as to the generally practical, or, one may say, positive spirit of his system. Theological questions, which had tortured the minds of generations, are by him relegated from the province of reason to that of faith. Even reason must be restrained from striving after ultimate truth; it is one of the errors of the human intellect that it will not rest in general principles, but must push its investigations deeper. Experience and observation are the only remedies against prejudice and error. Into questions of metaphysics as commonly understood Bacon can hardly be said to have entered, but a long line of thinkers have drawn inspiration from him, and it is not without justice that he has been looked upon as the originator and guiding spirit of that empirical school which numbers among its adherents such names as Hobbes, Locke, Hume, Hartley, Mill, Condillac, the Encyclopædists, and many others of smaller note.

In concluding this article, the writer desires to express his obligations to Mr James Spedding for various observations and suggestions made upon it before it went to press, and for the use of certain MS. notes relating to disputable passages in Bacon's life.

Biography.—Spedding, *Letters and Life of Lord Bacon*, 7 vols. 1862-74; Macaulay, *Essays*; Campbell, *Lives of Chancellors*; Montagu, *Works*, vols. xvi. and xvii., 1834; Hepworth Dixon, *Personal History of Lord Bacon*, 1861, and *Story of Lord Bacon's Life*, 1862. *Works*.—The classical edition is that by Messrs R. L. Ellis, J. Spedding, and D. D. Heath, 2d ed., 7 vols., 1870 (i.-iii. contains Philosophical Works; iv. v., Translations; vi. vii., Literary and Professional Works). Montagu's edition (17 vols., 1825-34)

³ See the vigorous passage in Herschel, *Discourse on the Study of Natural Philosophy*, § 105; cf. § 96 of the same work.

⁴ Bacon himself seems to anticipate that the progress of science would of itself render his method antiquated (*Nov. Org.*, i. 130).

⁵ *Nov. Org.*, i. 127.

is full, but badly arranged and edited. Of numerous editions of individual works, or portions of the whole, the following are good:—*Œuvres Philosophiques de Bacon*, par Bouillet, 3 vols., 1834; *Essays*, by Whately, 5th ed., 1866, and by W. A. Wright, 1862; *Novum Organum*, by Kitchin (1855); Translation by the same (1855); *Advancement of Learning*, by W. A. Wright. *Philosophy*.—Besides the Introductions in Ellis and Spedding's edition, the following may be noticed:—Kuno Fischer, *Franz*

BACON, JOHN, who may be considered the founder of the British school of sculpture, was born Nov. 24, 1740. He was the son of Thomas Bacon, cloth-worker in Southwark, whose forefathers possessed a considerable estate in Somersetshire. At the age of fourteen he was bound apprentice in Mr Crispe's manufactory of porcelain at Lambeth, where he was at first employed in painting the small ornamental pieces of china, but by his great skill in moulding he soon attained the distinction of being modeller to the work. The produce of his labour he devoted to the support of his parents, then in somewhat straitened circumstances. While engaged in the porcelain works he had an opportunity of seeing the models executed by different sculptors of eminence, which were sent to be buried at an adjoining pottery. An observation of these productions appears to have immediately determined the direction of his genius; he devoted himself to the imitation of them with so much success, that in 1758 a small figure sent by him to the Society for the Encouragement of Arts received a prize, and the highest premiums given by that society were adjudged to him nine times between the years 1763 and 1776. During his apprenticeship he also improved the method of working statues in artificial stone, an art which he afterwards carried to perfection. Bacon first attempted working in marble about the year 1763, and, during the course of his early efforts in this art, was led to improve the method of transferring the form of the model to the marble (technically called *getting out the points*), by the invention of a more perfect instrument for the purpose, which has since been adopted by many sculptors both in this and other countries. This instrument possesses many advantages above those formerly employed; it is more exact, takes a correct measurement in every direction, is contained in a small compass, and can be used upon either the model or the marble. In the year 1769 he was adjudged the first gold medal given by the Royal Academy, and in 1770 was made an associate of that body. He shortly afterwards exhibited a figure of Mars, which gained him considerable reputation, and he was then engaged to execute a bust of George III., intended for Christ Church, Oxford. He secured the king's favour, and retained it throughout life. His great celebrity now procured him numerous commissions, and it is said, that of sixteen different competitions in which he was engaged with other artists, he was unsuccessful in one case only. Considerable jealousy was entertained against him by other sculptors, and he was commonly charged with ignorance of classic style. This charge he repelled by the execution of a noble head of Jupiter Tonans, and many of his emblematical figures are in perfect classical taste. On the 4th of August 1799, he was suddenly attacked with inflammation, which occasioned his death in little more than two days, in the 59th year of his age. He left a widow, his second wife, and a family of six sons and three daughters. Of his merit as a sculptor, the universal reputation of his works affords decisive proof; and his various productions which adorn St. Paul's Cathedral, London, Christ Church and Pembroke College, Oxford, the Abbey Church, Bath, and Bristol Cathedral, give ample testimony to his powers. Perhaps his best works are to

Bacon und seine Nachfolger, 2d ed., 1875 (1st ed., 1856, trans. into English by Oxenford, 1857); Rémusat, *Bacon, sa vie, &c.*, 1857 (2d ed., 1858); Craik, *Bacon, his Writings and his Philosophy*, 3 vols., 1846-7 (new ed., 1860); A. Dörner, *De Baconis Philosophia*, Berlin, 1867; Liebig, *Ueber Francis Bacon von Verulam und die Methode der Naturforschung*, 1863; Lasson, *Ueber Bacon von Verulam's wissenschaftliche Principien*, 1860; Böhmer, *Ueber P. Bacon von Verulam*, 1864. (R. AD.)

be found among the monuments in Westminster Abbey. (See *Memoir of the late John Bacon, R.A.*, by the Rev. Richard Cecil: London, 1811.)

BACON, SIR NICHOLAS, lord keeper of the great seal in the reign of Queen Elizabeth, was born at Chislehurst in Kent in 1510, and educated at the university of Cambridge, after which he travelled in France, and made some stay at Paris. On his return he settled in Gray's Inn, and applied himself with such assiduity to the study of the law, that he quickly distinguished himself; and, on the dissolution of the monastery of St Edmund's Bury in Suffolk, he obtained a grant of several manors from King Henry VIII., then in the thirty-sixth year of his reign. Two years later he was promoted to the office of attorney in the court of wards, which was a place of both honour and profit. In this office he was continued by King Edward VI.; and in 1552 he was elected treasurer of Gray's Inn. His great moderation and prudence preserved him through the dangerous reign of Queen Mary. Very early in the reign of Elizabeth he was knighted; and in 1558 he succeeded Nicholas Heath, archbishop of York, as keeper of the great seal of England; he was at the same time made one of the queen's privy council. As a statesman, he was remarkable for the clearness of his views and the wisdom of his counsels, and he had a considerable share in the settling of ecclesiastical questions. That he was not unduly elated by his preferments, appears from the answer he gave to Queen Elizabeth when she told him his house at Redgrave was too little for him, "Not so, madam," returned he, "but your majesty has made me too great for my house." On only one occasion did he partially lose the queen's favour. He was suspected of having assisted Hales, the clerk of the hanaper, in his book on the succession, written at the time of Lady Catherine Grey's unjust imprisonment. Bacon was deprived of his seat at the council, and it was even contemplated to deprive him of the seal also. He seems, however, to have quickly regained his position, and to have stood as high in the royal favour as before. He died on the 26th of February 1579, having held the great seal more than twenty years, and was buried in St Paul's, London, where a monument, destroyed by the great fire of London in 1666, was erected to his memory. Granger observes that he was the first lord keeper who ranked as lord chancellor; and that he had much of that penetrating genius, solidity, judgment, persuasive eloquence, and comprehensive knowledge of law and equity, which afterwards shone forth with such splendour in his illustrious son.

BACON, ROGER. The 13th century, an age peculiarly rich in great men, produced few, if any, who can take higher rank than Roger Bacon. He is in every way worthy to be placed beside such thinkers as Albertus Magnus, Bonaventura, and Thomas Aquinas. These had an infinitely wider renown in their day, while he was ignored by his contemporaries and neglected by his successors; but modern criticism has restored the balance in his favour, and is even in danger of going equally far in the opposite direction. Bacon, it is now said, was not advanced by his age because he was so completely in advance of it; he is a 16th or 17th century philosopher, whose lot has been by some accident cast in the 13th century; he

is no schoolman, but a modern thinker, whose conceptions of science are more just and clear than are even those of his more celebrated namesake.¹ In this view there is certainly a considerable share of truth, but it is much exaggerated. As a general rule, no man can be completely dissevered from his national antecedents and surroundings, and Bacon is not an exception. Those who take up such an extreme position regarding his merits have known too little of the state of contemporary science, and have limited their comparison to the works of the scholastic theologians. (We never find in Bacon himself any consciousness of originality; he has no fresh creative thought or method to introduce whereby the face of science may be changed; he is rather a keen and systematic thinker, who is working in a well-beaten track, from which his contemporaries were being drawn by the superior attractions of theology and metaphysics.)

Roger Bacon was born in 1214, near Ilchester, in Somersetshire. His family appears to have been in good circumstances, for he speaks of his brother as wealthy, and he himself expended considerable sums on books and instruments; but in the stormy reign of Henry III. they suffered severely, their property was despoiled, and several members of the family were driven into exile. Roger completed his studies at Oxford, though not, as current traditions assert, at Merton or at Brazenose, neither of those colleges having then been founded. His great abilities were speedily recognised by his contemporaries, and he came to be on terms of close intimacy with some of the most independent thinkers of the time. Of these the most prominent were Adam de Marisco and Robert Grosseteste (*Capito*), afterwards bishop of Lincoln, a man of liberal mind and wide attainments, who had especially devoted himself to mathematics and experimental science.

Very little is known of Bacon's life at Oxford; it is said he took orders in 1233, and this is not improbable. In the following year, or perhaps later, he crossed over to France, and studied for a considerable length of time at the university of Paris, then the centre of intellectual life in Europe. The years Bacon spent there were unusually stirring. The two great orders, the Franciscans and Dominicans, were in the vigour of youth, and had already begun to take the lead in theological discussion. Alexander of Hales, the author of the great *Summa*, was the oracle of the Franciscans, while the rival order rejoiced in Albertus Magnus, and in the rising genius of the angelic doctor, Thomas Aquinas.

The scientific training which Bacon had received, partly by instruction, but more from the study of the Arab writers, made patent to his eyes the manifold defects in the imposing systems reared by these doctors. It disgusted him to hear from all around him that philosophy was now at length complete, that it had been reduced into compact order, and was being set forth by a certain professor at Paris. Even the great authority on which they reposed, Aristotle, was known but in part, and that part was rendered well-nigh unintelligible through the vileness of the translations; yet not one of those professors would learn Greek so that they might arrive at a real knowledge of their philosopher. The Scriptures, if read at all in the schools, were read in the erroneous versions; but even these were being deserted for the *Sentences* of Peter Lombard. Physical science, if there was anything deserving that name, was cultivated, not by experiment in the true Aristotelian way, but by discussion and by arguments deduced from premises resting on authority or custom. Everywhere there was a show of knowledge covering and concealing fundamental ignorance. Bacon, accordingly, who knew what true science was, and who had glimpses of a scientific organon or method, withdrew from the usual

scholastic routine, and devoted himself to languages and experimental researches. Among all the instructors with whom he came in contact in Paris, only one gained his esteem and respect; this was an unknown individual, Petrus de Maharncuria Picardus, or of Picardy, probably identical with a certain mathematician, Petrus Peregrinus of Picardy, who is perhaps the author of a MS. treatise, *De Magnete*, contained in the Bibliothèque Impériale at Paris. The contrast between the obscurity of such a man and the fame enjoyed by the fluent young doctors of the schools seems to have roused Bacon's indignation. In the *Opus Minus* and *Opus Tertium* he pours forth a violent tirade against Alexander of Hales, and against another professor, not mentioned by name, but spoken of as alive, and blamed even more severely than Alexander. This anonymous writer, he says, who entered the order when young (*puerulus*), who had received no proper or systematic instruction in science or philosophy, for he was the first in his order to teach such subjects, acquired his learning by teaching others, and adopted a dogmatic tone, which has caused him to be received at Paris with applause as the equal of Aristotle, Avicenna, or Averroes. He has corrupted philosophy more than any other; he knows nothing of optics or perspective, and yet has presumed to write *de naturalibus*; he is ignorant of speculative alchemy, which treats of the origin and generation of things; he, indeed, is a man of infinite industry, who has read and observed much, but all his study is wasted because he is ignorant of the true foundation and method of science.²

It is probable that Bacon, during his stay in Paris, acquired considerable renown. He took the degree of doctor of theology, and seems to have received from his contemporaries the complimentary title of *doctor mirabilis*. In 1250 he was again at Oxford, and probably about this time, though the exact date cannot be fixed, he entered the Franciscan order. His fame spread very rapidly at Oxford, though it was mingled with suspicions of his dealings in magic and the black arts, and with some doubts of his orthodoxy. About 1257, Bonaventura, general of the order, interdicted his lectures at Oxford, and commanded him to leave that town and place himself under the superintendence of the body at Paris. Here for ten years he remained under constant supervision, suffering great privations, and strictly prohibited from writing anything which might be published. But during the time he had been at Oxford his fame had reached the ears of the Papal legate in England, Guy de Foulques, a man of culture and scientific tastes, who in 1265 was raised to the papal chair as Clement IV. In the following year he wrote to Bacon, who had been already in communication with him, ordering him, notwithstanding

¹ It is difficult to identify this unknown professor. Brewer thinks the reference is to Richard of Cornwall; but the little we know of Richard is not in harmony with what is said here, nor with the terms in which he is elsewhere spoken of by Bacon. Erdmann conjectures Thomas Aquinas, which is extremely improbable, as Thomas was unquestionably not the first of his order to study philosophy. Cousin and Charles think that Albertus Magnus is aimed at, and certainly much of what is said applies with peculiar force to him. But some things do not at all cohere with what is otherwise known of Albert. The unknown is said to have received no regular philosophic training; we know that Albert did. The unknown entered the order when very young; unless the received date of Albert's birth be false, he did not enter till nearly twenty-eight years of age. Albert, too, could not be said with justice to be utterly ignorant of alchemy, and his mechanical inventions are well known. It is worth pointing out that Brewer, in transcribing the passage bearing on this (*Op. Ined.* p. 327), has the words *Fraterum puerulus*, which in his marginal note he interprets as applying to the Franciscan order. In this case, of course, Albert could not be the person referred to, as he was a Dominican. But Charles, in his transcription, entirely omits the important word *Fraterum*. There are other instances in which Brewer and Charles do not agree, e.g., according to Brewer, Bacon speaks of Thomas and Albert as *pueri duorum ordinum*; according to Charles, he says, *primi duorum ordinum*; a discrepancy not unimportant.

² See Dühring, *Kritische Ges. d. Phil.* 192, 249-51.