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ROGER BACON
in Life and Legend

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R O G E R
B A C O N

in Life and Legend

★ ★ ★ ★

by

E. WESTACOTT



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“Whither do we have to go to hear the real truth about human life? To the old wives’ tales! There is the wisdom that is rooted and grounded in experience! There is the wisdom that is nursed in common sense, in common sense and interpreting experience!”

John Cowper Powys, *In Spite Of*.

FOREWORD

HAVING been informed by a present day authority that "There does not appear to be any book in English which can be described as a 'Life of Roger Bacon' ", and that "Emile Charles's *Vie de Roger Bacon*¹ has never been translated into English", this work is an attempt to place before English readers as much information as possible concerning this "old English philosopher", the book being largely based on Charles's great biography (particularly Chapters I-III) from which much knowledge has been obtained.

Since Charles claimed to have examined with care the original MSS. existing in a more or less fragmentary state in English and Continental libraries, no repetition of this achievement has been made.

Indebtedness must be expressed to Dr. E. J. Dingwall, M.A., D.Sc., Ph.D. for suggestions on certain lines of reading, and to the authorities of Hitchin Public Library for obtaining for me many books without which it would have been impossible to undertake the necessary research.

Thanks are also due and acknowledged to all authors and publishers of the works named in the Bibliography. Gratitude and appreciation are here tendered to Miss Jessie Hill and to Mrs. J. Smith for their kind and valuable assistance in the dictating and checking of the manuscript. Thanks, and appreciation are extended to the publishers for their interest and helpfulness.

One of the nearest approaches to a *Life* is that section of Lynn Thorndike's *A History of Magic and Experimental*

¹ *Roger Bacon: Sa vie, ses ouvrages, et ses doctrines d'après les textes inédits* by Emile Charles, Professor of Logic in the Lyceum of Bordeaux. (Paris. Librairie de L. Hachette et Cie, Rue Pierre-Sarrazin, 14. 1861.)

FOREWORD

Science devoted to Roger Bacon. These chapters by the Professor of History in Western Reserve University represent a standpoint on the subject which differs from those of other biographers, this author maintaining that Bacon was much more a child of his age than he is usually considered to have been, that he was not persecuted by the Church and was only one of a long series of writers who had interested themselves in magic, astrology and science. Among such was Bacon's contemporary, Albertus Magnus, to whom Thorn-dike ascribes the *Speculum Astronomiae*, herein differing in opinion from Father Mandonnet who attributed it to Bacon. (See *Revue Neo-Scholastique*, Vol. XVII (August 1910), pp. 315-35.) He, however, agreed with Mandonnet that the importance of Bacon has been over-estimated.

After the following pages were in the hands of the printers my attention was called to a volume published in 1950 by Theodore Crowley, containing a detailed study of the life and works of Roger Bacon and of his philosophical beliefs and teachings, with an extensive Bibliography, to which the student of scholasticism is referred.

INTRODUCTION

ON the title page Charles has quoted from the *Opus majus*, p. 3, as follows, "Those reconstructing works always receive contradiction and obstruction, and yet the truth prevailed and will prevail until the day of Anti-Christ."

In a Preface (not so named) Charles introduces his *Life of Bacon* by a reference to the article by M. V. Cousin in the *Journal des Savants*, in which the philosopher is termed "one of the most liberal and greatest minds of the middle ages".

In his work Cousin made the suggestion that some learned man in Oxford or Cambridge should undertake the biography of Bacon which Charles has taken upon himself to attempt. After searching the libraries of France and England and such works as *L'Histoire littéraire de la France*, he claimed to fill a gap in the history of the philosophy of the thirteenth century.

This biography he divided into five parts, in which he passes no judgment upon Roger Bacon, but essays an impartial presentation of the man and his message.

Chapter I commences with a record of the writers who have mentioned Bacon by name, chiefly in the sixteenth century. Leland attempted to reassemble the fragments of the works; Balaeus,¹ the admirer of Wycliffe, gave him a place among the great men of Britain; John Pits wrote of him with respect, whilst Luke Wadding [1558-1657], the historian of the Franciscan Order, repeated his assertions. Charles also refers to John Dee [1527-1608], the alchemist,²

¹ The nearest name to Balaeus in *Chambers's Biographical Dictionary* is that of John Bale [1495-1563] author of a Latin history of English literature, which appeared in 1548.

² His reputation as a sorcerer rested on his possession of a mechanical beetle, and he claimed to have found in Glastonbury the Elixir for transmuting gold. See also K. K. Doberer, *The Goldmakers* (translated by E. W. Dickes), Nicholson & Watson, London, 1948.

INTRODUCTION

as well as to lesser known writers whom he names—Naudé, William Cave [1637–1713], Oudin, and Combach (Professor of Philosophy at Marburg), who proved himself “a zealous editor” of the *Perspective* and the *Considerations of Mathematics*.

Allusion is also made to Kenelm Digby [1603–1665] and John Selden [1584–1654], and to them is attributed the plan of publishing Bacon’s complete philosophical works, a plan which proved too difficult to fulfil. Thus it was left to the English doctor, Samuel Jebb [1694–1772] to publish at the request of Richard Mead, the London physician, an edition of the *Opus majus*. Another rare edition was reproduced in Venice in 1750 by “the Franciscans della Vigna”. Finally, in his own day, Charles has nothing but praise for the work of M. V. Leclerc, in his *L’Histoire littéraire de la France*, while Cousin’s contribution to the *Journal des Savants* appeared in 1848.

Charles informs us that Leland’s pages on Bacon were reproduced by Thomas Tanner [1674–1735] in his *Bibliotheca Hiberno Britannica* (London, 1748), but, notwithstanding all the allusions, so little is known of Bacon that he himself was obliged to turn to the printed works and especially to the manuscripts for his biography.

THIRTEENTH-CENTURY BACKGROUND

IT has been pointed out that the life of Roger Bacon was, except for fourteen years at the commencement and eight years at the end, co-terminous with the whole of the thirteenth century.

It was a century of strife both in the West and in the East. In England loyal barons strove with those who supported the French conquests, while on the Continent the long and desperate war of words and deeds between Innocent III and later Popes on the one side, and the Emperor Frederick II on the other, resulted in a long succession of battles and massacres in Italy and Sicily. The French King, Louis IX, heard the call of the Crusades, which were responsible directly and indirectly for so many deaths from violence and disease.

In distant Asia, Jenghiz Khan had died in 1227, and with the election of his son Ogdai expansion of Mogul rule took place under the command of Batu, son of Jagi—a brother of Ogdai who had died during the lifetime of Jenghiz. The Tartar invasion of Europe, which had reached Hungary and threatened to overwhelm Western Europe, as it had ruined and ravaged Southern Russia, was brought to an end by the death of Ogdai in 1241, which created the necessity of holding a council to elect his successor. The election of Kuyak in 1246 was attended by Friar John de Plano Carpini, whose attendance at the celebrations in Central Asia bore witness to the existence of a force which did not rely on swords or armies to make its voice heard in the world.

Carpini was one of those travelling emissaries of the little Poor Man of Assisi, who "above the battle" bade men abandon their arms, make up their quarrels, seek reconciliation

THIRTEENTH-CENTURY BACKGROUND

with their personal and national foes, and bring about peace by understanding and negotiation.

The Franciscans journeyed far—to England and Germany—preaching the Message and gaining adherents wherever they went. With the rise of the universities, like Paris and Oxford, the Preachers became students and scholars, embracing many such within their Order.

Thus the thirteenth century became a period of immense intellectual activity, based on a renewal of interest in classical authors, particularly Aristotle, in the writings of the Christian Fathers and of the Arabian philosophers and doctors, resulting not only in scholasticism but in a fresh outlook upon science in all its branches. Upon all these forms of knowledge, as upon the life and learning of his time one man was to stamp the indelible impression of his thought, and that man was Roger Bacon.

I The Life of Roger Bacon

The monk of Oxford has paid with his repose and with his liberty for the privilege of being in advance of his time.

Emile Charles, *Roger Bacon*, 53.

THE date of Roger Bacon's birth is uncertain. He was born at Ilchester, in Somerset, identified by some with Iscalis, mentioned by Ptolemy. The site of a Roman villa has been discovered there.

Writing to the Pope in 1267 Roger says that for forty years since he learned the alphabet he had not ceased from study. By adding thirteen years to these forty and then reckoning back we reach the year 1214 which is usually accepted as the year of Bacon's birth.

His family was of high estate and wealthy and some of his brothers were associated with the disorders of the reign of Henry III, in which they showed loyalty to the King against the barons. As a result they suffered banishment and constant change of abode, involving them in financial loss, which brought Roger to a state of penury. By the year 1267 his father was dead and his mother living with her son, Roger's eldest brother.

After being educated at home for a time, Roger Bacon went to Oxford, where he found masters likely to encourage his love of science and of languages, and to strengthen his own independence of mind and contempt for authority.

Such men were Robert Bacon (probably an uncle), Adam de Marisco, Richard Fitsacre, Edmond Rich and Robert Grosseteste.

Edmund Rich¹ [1175–1240] was born at Abingdon and educated at a grammar school in Oxford. Later he studied in Paris, where he graduated, afterwards returning to Oxford where he was the first to lecture on Aristotle. In 1233 he was appointed Archbishop of Canterbury, at the suggestion of Pope Gregory IX, and is termed in the *Encyclopædia Britannica* “one of the most saintly and attractive figures in the history of the English Church”. He was canonized in 1247, and on account of his asceticism seems to have well deserved the title of ‘Saint’. He is said to have experienced visions while still a schoolboy.

Robert Grosseteste² [1176–1253] born at Stradbroke, in Suffolk, was educated at Oxford, studying law, medicine and the natural sciences. Notwithstanding the fact that he knew little Greek or Hebrew, and was little interested in the works of Aristotle, he found favour with Bacon on account of his knowledge of natural science. In 1235 he became Bishop of Lincoln, and is celebrated not only as an ecclesiastic but as a statesman, and as the first physicist and mathematician of his age. His ideas were subsequently developed by Bacon.

Adam de Marisco, called in English Adam Marsh [*circa* 1200–1258], Franciscan scholar and theologian, was born in the diocese of Bath, and was at Oxford the pupil of Robert Grosseteste. About 1238 he was the lecturer at the Franciscan House at Oxford, where he taught Roger Bacon, who recognized his greatness in theology and mathematics. As a Franciscan he sought to exercise the office of a mediator between the warring sides in the state, rebuking both, in his capacity as statesman.

¹ There is an account of Rich in Elizabeth Goudge, *Towers in the Mist*, a study, in novel form, of Oxford down to the end of the reign of Elizabeth I.

² We are told by Francis Seymour Stevenson, M.P., in his *Robert Grosseteste* that “Roger Bacon constantly spoke of him as Saint Robert, and the rules which he composed for the guidance of the Countess of Lincoln were all called ‘Reules of Seynt Robert’”, p. 327. (London. Macmillan & Co. Ltd. 1899.)

These men were, according to Matthew Paris,¹ "the greatest of those who were then reading".

Civil strife made it necessary to rebuke the discontented barons, and the preacher selected to administer the admonitory sermon was Robert Bacon, who, after his address, warned the King that peace was impossible so long as he banned from his advisers Pierre Desroches,² Bishop of Winchester. He emphasized the need for caution, reminding the monarch of the perils of a ship at sea—stone and rocks.

Roger was present at this scene, which took place at Oxford in 1233, he being then about nineteen years of age, and it has been suggested that he was himself responsible for this bold irony.

After proving an apt pupil of his Oxford teachers, Bacon proceeded to Paris, where he obtained his doctorate, pursuing his studies till, according to his own statement, the year 1250 when he returned to Oxford.

His gifts were at first recognized but soon his renown was clouded; he became hated through jealousy and on account of the harshness of his character, with the result that his second period of residence in Paris began in 1257, the first having begun not later than 1234.

While in France he encountered the revolt of the Pastoureaux³ and remarked, "I have seen their chief and have seen that he carries in his hand some sacred talisman, and so to speak some relics".

¹ MATTHEW PARIS [1200–1259], chronicler of the thirteenth century, entered the Benedictine monastery of St. Albans in 1217. His chief work is *Historia major* dating from the creation to 1259. He appreciated strength of character, even though it should pursue a pathway of which Paris did not approve.

² Was for a time in charge of King Henry III, but was replaced for four years by Hubert de Burgh. When the latter fell from favour in 1232 became administrator for the King.

³ The name given to the Shepherds' Crusade in the middle of the thirteenth century when a Master Jacob came from Hungary into northern France in the year 1251. As a linguist, he knew Latin, German and French, and stated that he had been sent by God as the Head of a Crusade, composed of members of the ordinary people. These ordinary people, particularly shepherds, quickly gathered

At this time Alexander of Hales¹ was entrusting his teachings to Jean de la Rochelle, and in 1245 Albertus Magnus (Albert the Great) was preparing to take up his neglected studies.

Alexander of Hales was born in Gloucestershire, trained in the monastery of Hales, became an Archdeacon, and later repaired to Paris where he took the degree of Doctor, and became famous as a teacher. This title he refused to relinquish when he entered the Franciscan community, and his fame rests upon his work, the *Summa theologiae*, undertaken at the request of Pope Innocent IV. The form of this *Summa* is that of question and answer, and it was intended to be a system of instruction for all the schools. The "irrefragible doctor" died in 1246.

Albert of Cologne [*circa* 1205–1280] called "the Great" and "the Universal Doctor", was a member of the Dominican Order, and the instructor of Thomas Aquinas.² As Provincial

round him to the number, it is said, of 100,000. Jacob claimed to have had heavenly visitations and to have seen angels.

The movement was at first accepted by those in authority, but soon became suspected by them on the grounds that it was anti-Jewish and anti-clerical. Violence supervened, with the result that the Shepherd's leader was killed in an affray. See *The Encyclopædia of Religious Knowledge* (Schaff-Herzog), Vol. VIII (London, Educational Book Co., Ltd.) which states that the writings of Matthew Paris are the chief source of our information.

¹ ALEXANDER OF HALES was succeeded by Jean de la Rochelle, who taught only till 1253. Alexander was the author of a treatise *De anima*, which was interesting inasmuch as it showed that psychology formed part of the discussions of the time, which naturally resulted from acquaintance with Aristotle's *De anima*, and the numerous Greek and Arabian commentaries upon it.

² See reference in Charles, *Vie de Bacon*, to the pupil of Albert, called "the great dumb Bull of Sicily". Thomas Aquinas [1227–1274] the "Dumb Ox" is said to have been so named by his fellow pupils at Cologne, on account of his silence and apparent stupidity, but his teacher remarked "that if that ox should once begin to bellow, the world would be filled with the noise". William A. Wheeler, M.A., *A Dictionary of the Noted Names of Fiction*. (London. George Bell & Sons. 1876.)

of his Order he publicly defended it against the University of Paris, and replied to the argument of Averroes.¹ He studied thoroughly both the works of Aristotle in the Latin translations, and also the commentaries thereon of Arabian philosophers, with the result that he became a master in the art of systematized thought, and was sometimes scornfully termed the "Ape of Aristotle". One of his chief works was a commentary upon the *Summa theologiae*, but he also had a wide knowledge of physical science, and is reputed to have been learned in magic.

In Paris Bacon was at first scandalized by the vices and turbulence of the clerks, and this led him to begin that enquiry regarding people and things which caused him to censure the first and to seek to reform the second.

The doctors were intolerant theologians, or followers of Averroes, who was considered the most impious enemy of all religions. This Arabian philosopher [1126–1198] was one of the commentators of Aristotle's works, and had studied many subjects, including medicine, his doctrine of the "active intelligence" being afterwards discussed by Bacon and other scholastic authorities.

Such were the many masters from whom a choice might be made by a scholar like Roger Bacon, but he selected none of them, but rather an obscure person of whom history has lost all trace.² After examining the doctrines of Greeks and Arabs, of Franciscans and Dominicans, he found no sufficient

¹ ABRIL WALID AVERROES [1126–1198] greatest Arabian philosopher in the West and commentator upon Aristotle. Born in Cordova, he studied many subjects, including medicine, and owes his fame to the Christian schoolmen who admired and utilized his commentaries. These were called in Paris the Latin Averroists. It remained for Theophrastus Bombast von Hohenheim (Paracelsus), who lived 400 years later, to reject the teachings of both Averroes and Avicenna, and to consign to the flames their learned doctrines, on the grounds that they had for centuries fettered men's minds and prevented them from grasping Nature's truths.

² There is in the Imperial Library (Latin MSS. 7378) a collection of treatises entitled *Geometria*. Folio 67 begins with a collection manuscript entitled *Epistola Petri Peregrini de Maricourt ad Sygerium de*

satisfaction. Among his friends were William of Shirwood, the Treasurer of Lincoln Cathedral, the mathematician Campano of Navarre, Master Nicholas, the teacher of Amaury de Montfort, and John of London, called by the doctor-historian Samuel Jebb "John Peckham", but greater than these appears to have been his approved teacher Master Peter, venerated by Bacon as the most learned among the men of his time, and as a living example of true science. He seems to have been a remarkable figure from the portrait that Bacon has traced of him. A solitary man, eschewing renown, he sought to dissimulate his learning and to withhold from men the truth that they do not deserve to receive. He belonged to no powerful Order, and desired neither pupils nor admirers, dreading the importunity of the crowd and combining aloofness from mankind with an immense faith in himself. While he sought no 'Chair', he was himself beset by would-be students, who hastened to Paris to hear him, but he had a contempt for men, many of whom he regarded as fools and charlatans, who dishonoured philosophy, rendered medicine ridiculous, and falsified theology. His opinion seems to have been that those who see most clearly are in reality blind, and if they make vain efforts to perceive, truth dazzles them.

Hidden away in security and silence, he devoted himself to chemistry, natural science, mathematics, medicine and above all to experiment. "Lord of experimentation" was the name given to him by his pupil, and it was experimentation which revealed to him the secrets of nature, the art of healing, celestial phenomena and their relation to others, and to despise nothing which tended to increase knowledge and turn it to practical purposes.

Fontancourt, militem, de magnetē. According to Charles, Balaeus, Pits and Wadding falsely attribute this work to Bacon, whilst Wood and Cave, as well as Charles himself, believe its true author to be Peter Perigrinus. Charles goes on to quote M. de Humbold as mentioning a certain Adsygerius whom Bacon's biographer identifies with Peter Perigrinus, otherwise Peter de Maricourt, Master Peter. (See also an additional note on PETRUS PEREGRINUS at the end of this chapter.)

Certain authorities affirm that Master Peter, or Maître Pierre as he should be termed since he was a native of Picardy, was known to Bacon by other names, notably Petrus de Machariscuria, Macharniscuria, Peter de Maharncourt, and Pierre de Maricourt, according to the *Encyclopædia Britannica*, Vol. XXI, 294.

He is here mentioned as a recluse, a worker in metals, the inventor of armour, and the writer of a letter *De magnete*, which is partly reproduced in Libri's *Histoire des Sciences mathématiques en Italie*, 1838, ii. 70–71, 487–505.

This mysterious personage taught Bacon languages, astronomy, mathematics, and above all experimental science, so that one may be tempted to remark with some measure of truth that the great Roger was the "Ape of Pierre".

Master Peter was scornful of 'savants', calling them weaklings and inquisitors. He constructed a sphere intended to imitate the movements of the heavenly bodies, and he excelled in optics, studying refraction and burning glasses, but over and above all the knowledge that Bacon derived from his teacher must be set his admiration of independence of mind, and his hatred of the indifferent and uninstructed masses of mankind. Says Charles, "Pierre holds his closed hand full of truths; Bacon opens it widely."

On account of his poverty Bacon found himself at this time in need of help and protection, and three sources of power might have come to his assistance—the King, the Pope and a religious organization. When Adam de Marisco joined the Franciscan Order Bacon followed his example.¹ Previously he had possessed a certain amount of money, and it appears that both at Oxford and in Paris he had been engaged in numerous studies, inventing instruments, and instructing young men in astronomy, and in arranging astronomical tables. His

¹ Charles believes that Bacon joined the Franciscans at a fairly advanced age, proving this from words in the *Opus tertium*: "Whilst I was in another condition *in alio statu* they were astonished that I could stand the excessive work which I imposed upon myself". Since that time it appears that Bacon worked less strenuously.

acquaintance with the works of Seneca and with those of Cicero served to mature his ideas, and his familiarity with the classical authors aroused a discontent with the readers and copyists of Paris, who in translating the texts corrupted them.

Having completed his course of studies with Master Peter, Bacon spent seven or eight years at Oxford in the continuance of his researches, being at that period in the prime of life.¹ This time of comparative peace and prosperity was of short duration, being terminated by exile to Paris, due doubtless to the hostility evoked by both opinions and practices unacceptable to the Oxford authorities.

Thus in 1257 began that period of living entombment resulting from his incarceration within the walls of a Franciscan House, following on his denouncement in 1256 to the General of the Franciscans, Jean de Fidanza, better known as St. Bonaventura.

This man, called "the Seraphic Doctor", was born in Tuscany in 1221. It was the hope of his mother that he would enter the Church, and it was St. Francis of Assisi who gave him the name of Bonaventura, after ministering to him the power of healing. He entered the Franciscan Order in 1243, studying in Paris under Alexander of Hales, or his successor John of Rochelle. Having risen to heights of fame, he exercised his powers as General to forbid Roger Bacon to lecture at Oxford, and ordered him to Paris, probably on account of his disapproval of Bacon's hatred of authority, and of his scientific experiments.

¹ *Thorndike, op. cit.*, alleges that Bacon, before becoming a friar, had written students' text-books, but that he himself states that after joining the Franciscans he was not able to work so much and that he "took no part in the outward affairs of the university", on account of lack of health. He told the Pope that he was only composing a few chapters on one science or another in order to please his friends, and he wrote of himself as of one "unheard by anyone and as it were buried in oblivion", p. 621 (quoted from *Opus tertium*, Cap. i, Brewer, 7). Thorndike also states, p. 627, that in the *Opus minus* Bacon complained that "his prelates" required him to do things every day, and that in the *Opus tertium* he likewise murmured against continual "setbacks".

Bonaventura rejected Aristotle, condemning the Aristotelian doctrine of the eternity of the world, and attributing to this philosopher many of the prevalent heresies. He was an eminent theologian, but a mystical one, laying stress on the importance of the heart and of the emotions, and stressing the need for meditation and asceticism, as exemplified in the monastic way of life.

Bacon was at this time without friends, Grosseteste having died in 1253; Adam Marsh, Richard Fitzsacre, and Edmund Rich were occupied with other matters. He was obliged to leave his pupils, among them Friar Bungay, and his observation tower, whence it had been his habit to view the heavenly spheres. This was formerly shown to visitors at Oxford.

For the next ten years the Franciscan prisoner was subjected to persecution, exile and disgrace. At first he was forbidden to publish any work, which deprivation to one whose burning desire was to spread the truth as he believed it, was a severe one indeed. He agreed with the dictum of Seneca: "I love to learn, only in order to teach" and held that science would perish if it were not communicated to others.

Charles is of the opinion that since cloisteral life treats a man as if he were a child, his Order inflicted upon this great man the same chastisement as it would have inflicted upon a rebellious scholar. His diet was bread and water, but the starving of his body was not enough; intercourse with kindred minds was denied him; even his brother, who shared his intellectual abilities, was out of reach.

One consolation remained to him. A young man appointed to minister to his needs proved an apt pupil and devoted disciple, becoming later an exponent of great learning, so that Bacon was able to present him to Pope Clement IV as a product of his instruction, and an example of good education and good method. All that is certainly known of him is that he was called John.

Clement had been known earlier as Guido Foulques (or Fulcode), the son of a lawyer and judge. He himself studied law and became adviser to Louis IX of France. He married,

but after the death of his wife he took orders, and became successively Bishop, Archbishop (of Narbonne) and Cardinal Bishop of Sabina. In 1263 he was appointed to be Papal Legate in England and was elected Pope at Perugia in 1265.

As Archbishop, Guido heard of the Oxford monk, said to be possessed of marvellous secrets, which were the envy of his fellows. Being unable to communicate with Bacon, Fulcode made use of an intermediary, whose name was Rémond de Laon, and whose loyalty to Bacon was such that he could well be trusted to fill this office. Through him, Guido learnt that the imprisoned monk had written a great work on science and on the reform of philosophy. He wrote to Bacon several times but could not contact the incarcerated Brother.

In 1265 Fulcode became Pope (taking the name Clement IV), to Bacon's inexpressible joy. He cried out in triumph, "Blessed be God the Father of our Lord Jesus Christ Who has exalted on the throne of His Kingdom a prince who can serve the interests of science!" And again, "The time is propitious for the works of wisdom!"

Notwithstanding the strictness of his surveillance, he was at this time able to communicate with Clement through a knight named Bonneceor, making known his pitiable condition. He complained not only of the lack of books, but of the supervision of his writing, and of the difficulty of trusting only to memory.

In 1266 he received a letter from the Pope requesting that Bacon send him one of his works, but Clement did not, as yet, dare to set him free. The request was repeated, but fresh difficulties arose, through lack of books, copyists and money. Nevertheless, the *Opus majus* was produced, but at what cost he explained in the introduction, which seems to have been intended as a kind of reply to the Pope's letter, in which he traces the errors and ignorance of his century, and proposes remedies thereto.

At first the authorities in the Franciscan House did everything possible to hinder his labours. To Clement he wrote, "I will give you, perhaps, some certain details of the hard

treatment to which I am subjugated, but I will write it with my own hand in consideration of the importance of secrecy."

He complained, further, of his intermediaries that they did not make plain to Clement his desperate plight. In vain he sought to persuade them; in vain he appealed to his brother whose riches had vanished when his allegiance to the English King had brought him to ruin. He tried rich and powerful prelates, but the result was the same. They suspected him, distrusting his honesty.

At last Bacon bethought himself of poorer friends through whose help he was able to raise sixty pounds, and by this means was enabled to send the *Opus majus* by his disciple to Clement at Rome. Tradition states that John took with him certain instruments which Bacon had invented, among them a crystal lens to prove a point in optics.

The *Opus majus* was followed by *Opus minus* and *Opus tertium*, but the Pope was not satisfied, demanding perfect treatises on philosophy. In his reply, Bacon showed that larger works were impossible for him with the limited means at his disposal.

John has been identified with John of London, a friend of Bacon, but a master, not a disciple; and with John of Paris, of whom Bacon wrote:

"He is a poor child who has come to me and on whom I have had pity; I have nourished and instructed him for the love of God, and have loved him for his aptitude and good conduct. He is twenty years old, full of sweetness, goodness and discretion: and none in Paris knows philosophy better. He is well versed in the Scriptures and knows better than doctors of theology the errors in the sacred texts. The Pope can prove him."

Clement decided at length to give Bacon some marks of his sympathy other than a sterile and perhaps dangerous curiosity. The so-longed-for protector had appeared at last. Bacon was free again and returned to Oxford. His victory was short for his dream dissolved with the death of Clement in 1269.

His successor Gregory X [1271–1276] owed his election to Bonaventura, but Bacon remained undiscouraged. He published a new work of which fragmentary manuscripts remain, containing, besides purely scientific criticisms, attacks upon jurists, prelates, princes and the mendicant friars, the ignorance and dissolute conduct of priests, and the corruption which prevailed at Rome.

His enemies were on the watch and his nocturnal studies of the stars, his weird instruments, his alchemy, and his association with Friar Bungay,¹ a Franciscan mathematician and philosopher, who was considered a worker in witchcraft and charms, aroused suspicion.

In 1277 Archbishop Etienne Templer solemnly condemned more than two hundred philosophical propositions, some of them being those of Bacon.² The Franciscans, being influenced by new ideas, called for greater discipline, and after the death of Bonaventura in 1274, Jerome d'Ascoli became General of the Order, and proved himself a tyrannical

¹ THOMAS BUNGAY was born at the small town of this name near Lowestoft and was buried at Nottingham. He was accounted a magician.

² Thorndike, *op. cit.*, 628, mentions the *Chronicle of the XXIV Generals* (about 1370), which recorded that the teaching of "Friar Roger Bacon of England, master of sacred theology" was condemned because it contained "some suspected novelties". Later, on p. 674, Thorndike enquires as to the nature of these "novelties" for which the Friar was convicted in 1277 or 1278.

Thorndike states that other Franciscans had written on astrological subjects, and he refers to a rule drawn up in 1292 for the friars at Paris against the purchase of "curious books", probably like those which Bacon himself condemned. In this connection it is interesting to note that, according to Thorndike, p. 669, Bacon made a distinction between *mathematica* in the sense of superstitious occult practices, and the astrology which was considered legitimate. The four aspects of such *mathematica* appear to have been the belief in the fatal influence of the stars; the conjuration of demons; the association of astrological observations with figures and incantations; and the fraudulent methods employed by magicians in certain instances. The suggestion seems to be that Bacon went too far in some of his writings, thus provoking the wrath of the authorities.

character. He came to Paris in 1278 and held there a General Chapter, judgment being passed on Friar Roger Bacon who was termed Englishman and Master of Theology. Jerome forbade the Order to embrace his doctrines, and cast the author of them into prison, his Franciscan brothers showing no sympathy with the victim of the judgment.

Bacon himself wished to appeal to the reigning Pope, Nicholas III, while his followers tried to save him, but in vain. Jerome forestalled him, with the result that the old man was imprisoned for fourteen years, during which time he was unable to employ his talents, as is stated by some authorities.

It is also stated by some that Bacon sent to Jerome, who had succeeded to the Papacy as Nicholas IV [1288-1292] a treatise entitled *The Means of Retarding the Accidents of Old Age*, hoping, since all other means seemed futile, to interest, and perhaps to mollify him. It had the opposite result.

Four years later, in 1292, at the age of seventy-eight, Bacon composed his final work—*Compendium theologiae*, containing neither attacks nor complaints, but written as he himself stated, because “I have often been begged to write a work useful to theology”.

Thus in this year, Bacon was free for the first time to point out to his contemporaries the hindrances to science, and his suggestions for reform.

By this time Raymond Gaufredi, a man of enlightened mind and gentle character, occupied the position of General of the Friars Minor, and he at once sought to reverse the decrees of Jerome, who at this period was still living, and who objected to Raymond’s decision. He died later in the year.

In the same year Gaufredi, at the Chapter of Paris, revoked the sentences passed in 1278 on certain friars, who through his clemency, received their liberation. Among them was Bacon, whose imprisonment came to an end, though it has been suggested that the General’s action was an act of grati-

tude for the revelation to him of alchemical secrets by the monk of Oxford.¹

The date of this famous monk's death is uncertain, but it took place at Oxford, where he was buried. No trace remains of his monastery, nor indeed any sign of his sojourn in the city, except that a certain site still bears the name of "The Friars".

Twyne relates that the Friars Minor, viewing his works with horror, nailed them to planks and left them. This may account for the imperfect state of the manuscripts.

His ideas remained more or less hidden for three centuries. Not a doctor of the fourteenth century quoted him; a Scottish poet of the fifteenth century associated Bacon with other magicians and wrote of

"Frier Bacone with many subtil points of juglirie."

The theatre has represented him in the garb of a magician surrounded by frightening objects; as a patriotic Englishman who has written a marvellous work; as a head of brass which spoke and pronounced an oracle. Two friends questioned him. They asked him how Albion may be encircled with a wall of brass. At first, silence, but when the magician's attention is diverted, the head utters mysterious words, and they hear it not.

Naudé and others have sought to clear Bacon from the accusation of magic, by showing that Albert, Robert of Lincoln, Gerbert² and others, had also their head of brass and their speaking automaton.

Bacon had, according to Charles, no need of such an apology. He points out that the wonder of the public, bordering on horror, is the homage paid by the ignorant to a science which it does not understand.

¹ Charles believed that the gift was made to Nicholas III.

² GERBERT [940-1003] was born at Aurillac in Auvergne, and became Pope Sylvester II in 999. On account of his attainments in chemistry, mathematics and philosophy, he acquired the reputation of being in league with the devil. He was appointed Archbishop of Ravenna.

Charles goes on to relate that in 1433 the most precious books were sold by the successors of the great twelfth-century scholars to Doctor Thomas Gascoigne, who gave them, at a later date, to the libraries of Lincoln, Durham, Balliol and O'Neil. Many of these manuscripts have been recovered by the Bodleian, while some dispersed works of Bacon have at length found shelter there.

His French biographer gives 1779 as the year up till which Bacon's observatory tower was still shown to the public at Oxford, and he claimed that at the time when he was writing, no one had undertaken to study the riches enclosed within the libraries of more than one town, and that the manuscripts of Bacon had hardly been taken from the colleges at Oxford, and from the British Museum, except to be placed in French (presumably his own) hands.

ADDITIONAL NOTE ON PETRUS PEREGRINUS

A. C. Crombie, the latest exponent of the theory and practice of experimental science in his *Robert Grosseteste*, considers Roger Bacon "by far the most important" of the immediate disciples of the learned Bishop of Lincoln. Crombie states that, by the year 1266, Bacon had "maturely grasped the Grossetestian theory of experimental science" and had expounded it in the *Opus minus*. He advances the interesting suggestion that Petrus Peregrinus, as he terms him, had learnt from Bacon, and indirectly from Grosseteste. He quotes a remarkable passage from *De Magnete* as to the importance of the use and "carefulness" by the investigator "of his own hands".

Crombie goes on to point out that the *De Magnete* is "the best known example of the use of the experimental method in the thirteenth century", and that the first part treated of experiments in the study of magnetism, while the second described the construction of instruments. Then followed an account of experiments with a lodestone.

The conclusion of the treatise, which conclusion takes the form of a letter from the Picard Peregrinus to his fellow-countryman Sygerus de Fontancourt, affords, as Crombie informs us, "the only certain date in the meagre records of his life". The passage as quoted by Crombie runs thus: "Finished in camp at the siege of Lucera in the year of our Lord 1269 on the 8th day of August." *Robert Grosseteste and the origins of experimental science, 1100-1700* (Oxford. The Clarendon Press. 1953), pp. 162, 204-8.

II The Works of Roger Bacon

IN his biography of Roger Bacon, Charles is of opinion that it was his passion for liberty and reform for which Bacon was persecuted, not chiefly for necromancy, since a chapter of one of his treatises *Contra necromanticos*, is directed against the superstition. The treatise, however, upholds true astrology, as accepted by the greater minds of the time, as expressing the influence of the stars upon terrestrial phenomena.

The incriminating pamphlets *On the Prognostication of the Stars* and *True Astronomy* survive as fragments of the fourth part of the *Opus majus*. Bacon maintained that men have the power to counteract the potent influence of the stars, by the exercise of the will, as in overcoming the passions. He maintained, nevertheless, that the heavenly bodies ceaselessly influence our daily life, and that by studying these forces of nature one can foretell the future, and even shape magic formulas, and fashion charms efficacious in healing the sick, and put to flight evil spells.

Bacon indicated how wrong were the theologians in accusing this science. In *Opus majus*, p. 250, he writes, "One does not speak of it in public because one receives at once the name of magician; it has been abused; knaves have employed it, demons and women have been instructed and have spread this superstition which infects all nations."

In answer to the possible question as to how Bacon became charged with "certain suspected new-fangled notions", it may be stated that he seems to have derived them from his study of Arabian astrology, which emphasized the necessity of relating rites to the conjunction of the planets. The first author with whose works Bacon appears to have been familiar, and who taught this idea, was Albumazar.

This horoscope of religions was frowned upon by representa-

tives of orthodoxy, invoking, as it does, the dependence of religious systems upon the movements of heavenly bodies. It is possible that from his intimacy with Arabian astrological teachings the idea of a reform of the calendar may have suggested itself.

Had this remarkable student been willing to sacrifice his independence of mind, he might have won the support of his Order against the Dominicans, but he blamed the latter equally with the Franciscans and the Church, praising only the poor and humble, like his pupil and disciple John, and his master Pierre de Maricourt, like the suspect Robert of Lincoln, or like Adam de Marisco, and Thomas de Saint David.

One of his accusations against the religious Orders was that they permitted young boys to become doctors, without having first been pupils, or having been examined. He thundered against ignorance and corruption, maintaining that the former had never been so crass as during the previous forty years, during which the Orders had prided themselves on advancing science.

King, Pope and people were included in his diatribes, and he sought to model society on Christian principles, derived, not from the Doctors of the Church, but from pagan and infidel sources—Aristotle, Seneca, Plato, Socrates, Avicenna¹ and Alfarabilis, an eastern philosopher who wrote on very many subjects, after studying at Baghdad, travelled extensively, and died at Damascus.

It will thus be evident that Roger Bacon was persecuted for more weighty reasons than that of being suspected of being an astrologer.

The rarity of his works resulted from the circumstances of

¹ AVICENNA [979–1037], the greatest of Arabian scholars in the East, as Averroes was famous in the West, i.e. Spain. He was born near Bokhara and was physician to several rulers, the most important of his hundred treatises being his *Canon* of medicine, which remained a standard text-book till the time of Paracelsus, who repudiated his teachings. Other works were concerned with logic, physics, mathematics and metaphysics.

his life, troubled, as it was, by constant interference on the part of those who controlled it. Very few have been published; others are little more than fragments, scattered within the libraries of England and France.

An eighteenth-century physician, Samuel Jebb, M.D. [1694–1772], living at Stratford-le-Bow, undertook to publish what he believed to be the *Opus majus*, placing at the head of this edition a learned sketch of the author's life. This edition was reprinted at Venice in 1750.

Several French savants have attributed works to Bacon which Charles refused to recognize as his, but quotes from M. V. LeClerc's *L'histoire littéraire* the following printed works:

1. *Speculum alchimiae*. (Mirror of Alchemy); consisting of seven chapters reprinted in 1541 and 1702. Translated into English by one who is nameless, and into French by a gentleman of Dauphiné. Sometimes a false title *Miroir de maistre Jean de Mehun* is substituted for the Mirror of Alchemy "composed by the thrice famous and learned fryer, R. Bacon. Also a most excellent and learned discourse of the admirable force and efficiency of Art". (London. 1597.)

2. *De mirabili potestate artis et naturae ubi de philosophorum lapide*, etc. (Concerning the marvellous power of art and of nature everywhere by the stone of the philosophers.) Published by Oronce Finee. Paris. 1542. An often unintelligible and very defective edition reprinted in the *Theatrum chemicum*. Oxford edition. 1594. Hamburg edition. 1613. More intelligible. This work was translated into English in London in 1597 under the name of R. Bechin. In 1659 under the title *Frier Bacon, his discovery of the miracle of art, nature and magic* faithfully translated out of Dr. Dee's¹ own copy by T. M. and never

¹ DR. JOHN DEE [1527–1608] was born in London and educated at St. John's College, Cambridge. He led a long and varied existence, being associated with three monarchs—Edward VI, Mary of England and Elizabeth I, being employed both at home and abroad as a

before in English. One of the best known of Bacon's fragments.

3. *Libellus Rogerii Baconi Angli doctissimi mathematici et medici de retardis senectutis accidentibus et de sensibus conservandis*. Oxonae. 1590. (A little book of the most learned mathematician and physician Roger Bacon Englishman concerning the retarding of old age and with the senses retained.) Oxford. 1590. A very rare book. The Imperial Museum¹ possesses only one English translation. (The cure of old age and preservation of youth by the great mathematician and physician a Franciscan frier) translated, etc. by Richard Brown. London. 1683. An Oxford manuscript containing this pamphlet with a long dedication to a Pope, probably Nicholas III. Sixteen chapters deal with food, drink, warmth, preservation, etc.

4. *Sanioris medicinus magistri D. Roger Baconis Angli de arte chymiae scripta*. (Writings of the medicine of health of Roger Bacon Englishman concerning the art of chemistry.) Under this title are grouped six small pamphlets which are considered by Charles to bear the stamp of Bacon's style and doctrine. Three of these deal with alchemy and surpass in usefulness the *Speculum Alchimiae*.

physician, mathematician and astrologer. According to *Chambers's Biographical Dictionary*, Dee claimed to have found in the ruins of Glastonbury a quantity of the Elixir, one grain of which was alleged to transmute into gold a piece of a warming-pan. After the year 1581, Dee became acquainted with the doubtful character Edward Kelly, with whom he spent some years working at alchemy and necromancy. Dee died at Mortlake at the age of eighty-one. The full story of Dee and Kelly is to be found in the English translation by E. W. Dickes of K. K. Doberer's *The Goldmakers*, published by Nicholson & Watson, London, 1948. Doberer gives the interesting information that the Abbot's Kitchen at Glastonbury—an octagonal building—which still stands, was in the tenth century the scene of alchemical proceedings, under its Abbot Dunstan. The *Encyclopædia Britannica*, eleventh edition, mentions that Dee's *Speculum* or mirror, "a piece of solid pink-tinted glass about the size of an orange", is preserved in the British Museum.

¹ The Imperial Museum of Vienna founded in the fifteenth century.

There are also three letters to John of Paris under the title *Tractatus trium verborum*. (Three treatises of words.)

5. *Rogeri Baconis Angli viri eminentissimi Perspectiva*. (The Perspective of the most eminent man Roger Bacon Englishman.) Printed edition by Johannis Combachii. Frankfurt. 1614. In quarto. This is the fifth part of the *Opus majus*.

6. *Specula mathematica*. (Mathematical mirrors.) Printed as above. J. C. Frankfurt. 1614. The fourth part of the *Opus majus*.

7. *Roger Bacon Opus majus ad Clementem Papam*. (Roger Bacon *Opus majus* to Pope Clement.) Published by Samuel Jebb in 1733 and reprinted in Venice in 1750. This is the most important of Bacon's published works. The first part of the *Opus majus* consists of a long treatise (pp. 358-455) entitled *Tractatus magicki Rogeri Bacon de multiplicatione specierum*. (A treatise of magic of Roger Bacon concerning the multiplication of species.)

Charles claims to have examined forty manuscripts, of which France possesses only a small number. The Imperial Library offered four manuscripts of which No. 2598 in Folio 21 is a fragment. *Tractatus fratris Rogeri de generatione specierum*. (A treatise of Brother Roger concerning the generation of species.) And the other, Folio 57, another fragment without title, being the fifth part of the *Opus majus*, but incomplete. The other two, No. 7455 in older Latin and No. 1153 in newer Latin, contained nothing of importance. The second is very ancient with the title *D. Fratris Roger Bacon de naturis metallorum in ratione alchemica et artificiali transformatione*. (D. Roger Bacon concerning the nature of metals in the alchemical account and (concerning) transformation by art, that is craft.)

The Mazarin Library¹ possesses two manuscripts, one of no importance containing only a copy of *De multiplicatione* and of the *Perspective*; the other inscribed with the No., 127,

¹ In Paris. It was opened to the public in 1642.

is a magnificent in-folio on parchment, with two columns of a gothic writing of the fourteenth century. It belonged first to John Dee; later to Kenelm Digby¹ whose arms and device it bears: *Vindica te tibi*; finally to Richard O'Eden, whose signature may be read at the end. It is considered one of the most precious remains of Bacon's labours, and has for title *Incipit liber primus Communium naturalium fratris Rogeri B.* (Here begins the first book *Compendium naturalium* of Brother Roger B.) It has four principal parts, ninety folios being followed by a second treatise *De caelestibus*. (Concerning celestial things or matters.) The *Communia* refers to physics generally and its four parts are intact. The copies in the British Museum and the Bodleian Library are less complete.

The Library at Amiens contains, No. 406, an enormous parchment folio manuscript consisting of fourteenth-century commentaries on such questions as a book of physics attributed to Aristotle *De vegetabilibus*. (Concerning vegetable growths.) And a book with the title *De causis*. (Concerning causes.)

The Douai Library has a copy of the *Opus tertium*, more complete copies being in the British Museum and the Bodleian Library. It contains a Greek Grammar, being a copy of that at Corpus Christi College, Oxford, and a *Computus* which is an incomplete fragment of another manuscript in the British Museum.

The Cottonian Library² has four manuscripts, three of which consist of parts of the principal works, and a Calendar from the Tables of Toledo with Arabic figures and the date 1297.

¹ SIR KENELM DIGBY [1602–1665], author and diplomatist, presented in 1632 to the Bodleian Library a collection of 236 MSS. bequeathed to him by Thomas Allen.

² SIR ROBERT BRUCE COTTON, BART [1571–1631], antiquary, scholar, Parliamentarian and the author of certain tracts, collected books at his house in Westminster on the site of the present House of Lords, and originated the Library which bears his name, and was presented to the nation by his great-grandson, Sir John Cotton in 1700.

The Royal Library¹ has also four manuscripts, comprising, with other contents, part of the *Opus majus*.

Other Libraries which have Bacon remnants are the Harleian² and the Lambeth,³ but the greater number of his works are at the Bodleian, the Ashmolean Museum and at various Oxford colleges.

Among these works must be mentioned *De conservatione sanitatis et juventutis praeservatione autore Rogero Bacono vel Bacuno*. (Concerning the conservation of health and the preservation of youth by Roger Bacon or Bacun.) This is another name for the book, Concerning the Retarding of Old Age etc., published at Oxford.

Apart from these scattered remnants, five great compositions contain all his thoughts, and aim in writing, pursued for twenty-five years. These belong to two distinct periods. In the first Bacon prepares himself to be the most learned man of his century and the judge of it. Before 1267 he had written nothing of importance, except the *Computus naturalium* (Reflection on natural things) written in Paris in 1263.

In 1267 the five works were commenced:

1. *Opus majus*
2. *Opus minus*
3. *Opus tertium*
4. A work without a title
5. *Compendium theologiae*

The first was begun in 1267 at Paris at the invitation of the Pope, Clement IV, being composed of seven parts loosely connected. His tribulations had caused Bacon to omit certain

¹ This was the Library of the former Kings of England. It was added to the British Museum by George II in 1757, together with the Harleian and Cottonian Libraries.

² The Harleian Library was the collection of Robert Harley, Earl of Oxford.

³ Lambeth Library formed part of the Archbishops' Library at Lambeth.

sciences, amongst them alchemy; he therefore wrote an abridged version with additions which formed the *Opus minus*, one reason actuating him being the perils of the way and the fear of losing his work.

Bacon stated that, at the order of Seigneur Clement, he had brought together passages "chosen from the Holy Scriptures, canonical law and philosophy" and he used these as headings to the books he sent.

Opus minus, which was written under the pontificate of Gregory X between 1271 and 1276, was in two parts, the first a sort of dedicatory letter, and the second an exposition of the *Opus majus*.

Read Bacon's own description of this effort. "I have exposed the practical principles of Alchemy, above all according to Avicenna in his great work in his great Alchemy, which he calls The book of the soul, and I have treated of this subject in the *Opus minus*."

Important fragments of the *Opus minus* are to be found in the manuscripts of the Digby collection, Bodleian 1819. This manuscript gives the treatise of practical alchemy, which is in a bad state, and also a little pamphlet *De septem peccatis studii theologiae* (Studies of theology concerning the seven sins), and further, *De rerum germinibus* (Concerning kindred subjects) with regard to speculative alchemy.

Having obtained his freedom Bacon began the *Opus tertium*, which, according to his custom, recapitulated the substance of the *Opus minus*, adding "new parts of great price full of the beauty of science which exist no where else".

It is composed of seventy-five chapters, thirty of which seek to prove the usefulness of certain sciences, at that time unjustly discredited. It has five parts: Introduction; Grammar and Logic; Mathematics, general and particular; Physics, general and particular; Metaphysics and Morals.

The next of his great works was the *Compendium philosophiae* or *Liber sex scientiarum* (Summary of philosophy, or the book of the six sciences), these comprising grammar, logic, mathematics, physics and optics, alchemy and experi-

mental science, with an introduction. The date of this is 1272.

The date of the work on *The Retarding of Old Age* was 1276, and it was not until 1292 that his *Compendium studii theologiae* appeared in at least six parts.

Of these Charles states that he had no information regarding 3 and 4, and that one single mention has been made of the sixth part. The others were as follows: the first dealt with causes of errors; the second with logic and grammar; the fifth with optics and the multiplication of images.

It is also the opinion of Bacon's French biographer that a vast number of writings have been attributed to him by historians, which writings were probably not separate productions, but repetitions in various forms of treatises incorporating his ideas. Thus the one relating to *Old Age* appears under other titles, while the manuscripts of the *Perspective* are numerous.

The fifth part of Charles's *Life of Bacon* is headed "Analyses et Extraits des Ouvrages Inédits de Roger Bacon" in which he claims that he had transcribed as much from these manuscripts, as would, in the event of being able to publish, constitute several volumes. His idea was to preserve all that is most important from the manuscripts, but being obliged to abandon this undertaking, he claimed to have analysed the unpublished works and to have quoted from them, in order to establish the faithfulness of his presentation. Then follow fragments arranged in chronological order and in the original Latin from *Computus rerum naturalium*, *Opus majus*, *Opus minus*, and *Opus tertium*, the *Compendium philosophiae* and the *Compendium studii theologiae*.

III Teachings as shown in his Works

There is no plague comparable to the opinion of the crowd. The crowd is blind and wicked; it is the obstacle and enemy of all progress.

Roger Bacon, *Opus majus*, p. 6.¹

ACCORDING to Brother Roger the evil of his time, nay, the scourge which rendered futile men's best endeavours, was authority, by which he meant the exaggerated belief in certain great men and in certain doctrines, and the lack of liberty in matters where reason should reign supreme.

During twenty-five years he persisted in claiming the right to think freely and to illustrate precept by example.

In *Opus tertium* he wrote of "authority unworthy and fragile, the rule of routine, the stupidity of the common herd, the self-love of learned men who hide their ignorance under spread of apparent knowledge". (Chapter XXII.) These keep the world plunged in darkness and his works are destined to chastise them.

In the *Opus majus* he points out how, whilst respecting ancient writers, one must be willing to recognize the faults of the great, such as Aristotle and the Arabian philosophers.

In the *Compendium theologiae* he declared, "It is a wretched argument that is supported by custom and tradition." (Part I, Chapter 2.) Likewise in *Opus majus* he shows that where such arguments prevail "reason loses its way, judgment is perverted".

In addition to these words of wisdom, the following results

¹ Quotations by Charles from original manuscripts.

are, according to Bacon, due to a too close adherence to the dictates of the past. "Laws are violated, good disappears, nature loses her authority; thus the face of things is overturned, order is confounded, vice triumphant, virtue extinguished, error reigns and truth vanishes."

The above passage will be found on page 3, and on page 6 he goes on to say that great men of all time have avoided the crowd—a crowd did not witness Christ's transfiguration—and after hearing the teachings of Jesus over a period of years, the multitude was ready to cry "Crucify Him!"

This hatred of the crowd was part of Bacon's character, and when as an old man, after years of imprisonment, he again took up his pen, he still was unprepared to cast the pearls of his sagacity before the unheeding mass of mankind.

Another object of Bacon's ire was the incorrect translation of ancient authors, and he even went so far as to assert that it would have been better for Aristotle not to have been translated at all, rather than in such a manner as to be disfigured by obscurity and error. He referred to his friend Robert of Lincoln who, despairing of the translation of Aristotle's works, had sought other sources and the better way of experiment.

In the *Compendium philosophiae* Bacon stated that if he had to dispose of the works of Aristotle, he would burn them rather than waste time over renderings which were likely to engender falsehood, and propagate erroneous ideas. (Part I, MS. in British Museum.)

Bacon's anger flamed up against certain personalities, particularly against one—probably Alexander of Hales, who had become a Franciscan and whose *Summa theologiae* (Contents of theology) he affirmed to be full of mistakes. He was also far from sparing Albertus Magnus and Thomas Aquinas, maintaining that, "All the moderns, with some exceptions, despise the sciences, and above all the new theologians, the chiefs of the Minors and of the Preachers, who console themselves for their ignorance and display their vanities before the eyes of the imbecile multitude."

Bacon was convinced that the whole scholastic system was

bad, that another was needed, and that other was experience as opposed to scholasticism, by which he meant the translation and adaptation of classical works, so that they might conform to the doctrines of the Church.

Charles points out that Bacon was the first to call the natural sciences experimental sciences. "There are", cried Bacon, "only two ways to arrive at knowledge—experience (through personal experiment) and reason". (*Opus majus*, p. 199.)

When, however, Bacon wrote of "interior illumination, divine inspiration" he may, as Charles suggests, have been thinking of what he termed the "active intelligence" (*l'intellect agent*), rather than of mysticism. His general meaning seems to be that experience, to be perfect, must be based on virtue, that the evil man is ignorant, and that morality is the condition of knowledge, as virtue should be its results.

The prejudice against anything claiming to be super-normal expresses itself in Charles's criticism of Bacon's references to alchemical phenomena. He indicates that Bacon did not always remain true to this precept and sometimes attributed to experiment too great a power, as in his belief in elixirs and transmutations.

In the age in which he lived "the admirable doctor's" considered opinion was that grammar was the most useful of the sciences, and he urged its study in conjunction with that of languages, besides Latin; for example, Greek, Hebrew, Arabic and Chaldean. He quoted, for instance, Robert Grosseteste, one-time Bishop of Lincoln, who, having funds at his disposal, invented instruments and examined rare and precious works. Then he cited his own example of having learned four languages, in the hope that good results might follow; trade between nations; the conversion of pagan peoples to Christianity; the establishment of friendly intercourse with the Greek Church.

Brother Roger argued that if his pupil John could become learned in a short time, what could not a mature scholar perform in this way? He believed that knowledge should pro-

ceed from the general to the particular; that books should be divided into preliminaries, which he called *communia*; sections, which he called distinctions, and subdivided into chapters. He likewise laid down rules for composition, and he urged the study of ancient writers who have attained by the light of reason only. These men have not despised mathematics. Mathematics must be included with grammar in the work of regeneration, since various branches of science serve to support each other. Some are purely speculative; geometry, arithmetic, astronomy, acoustics, each corresponds with a practical science, since the knowledge of lines, surfaces and solids ensures the well-being of humanity, in agriculture and all constructive occupations, from house-building to scientific instrument-making.

Bacon was the first to understand and to point out the application of mathematics to physical sciences. "Physicians", he repeatedly declares, "must know that their science is impotent if they do not apply to it the power of mathematics".

He considered metaphysics a speculative science; morality is practical and the queen of sciences. With great boldness Bacon asserted the superiority of the pagan world to that of the Christian world, which he knew, and he insisted on proclaiming, "There is no great moral or religious truth concerning God and the soul which the ancient philosophers had not perceived".

In the thirteenth century strife was beginning between civil rights and canonical law,¹ and Bacon's defence of the latter against the jurists found expression in the *Compendium philosophiae* in which he showed that civil right concerns temporal princes and the laity.

The first chapter of the *Tertium* begins:

"To neglect knowledge is to neglect virtue; the intellect lightened by the flame of goodness cannot help but love

¹ "Canon Law is the sum of the laws which regulate the ecclesiastical body: for this reason it is also called ecclesiastical law." *Encyclopædia Britannica*, eleventh edition.

it. Love is only born of knowledge. Reason is the guide of a right will. It is reason which leads us to salvation. The true and the good are one; in order to do good one must know it; in order to avoid evil one must discern it; ignorance is the mother of sin; the man surrounded by darkness throws himself into evil as a blind man into a ditch; the enlightened man, on the contrary, may neglect his duty but his conscience returns to repentance and to right ideas.”

It was from a sense of duty to the Church and to truth that Bacon denounced the ignorance and vanity of the great doctors.¹

Bacon defended as much as he accused. In the *Opus tertium*, Chapter XVII, he explained that:

“From my youth I have worked at languages and at all sciences of which I speak; I have welcomed all that could serve my aim, and I have got into touch with all people who could help me; I have sought the friendship of the Latin sages; I have instructed young people in languages, calculation, drawing and the art of constructing instruments and other necessary knowledge. I have neglected nothing; I know how one must proceed, with what aids, and against what obstacles. But lack of resources stops me. If each one did as I do, one would soon reach the good end; in twenty years I have spent more than two thousand pounds.”

¹ *Thorndike* maintains, *op. cit.*, 636, that Bacon's criticisms of the powers that were, were borrowed from other sources such as the writings of Adelard of Bath, and that they applied merely to the previous “forty years”. Further that they were levelled against the state of affairs in France and England, and mainly at Paris and Oxford. He apparently wrote little of Germany, Italy and Spain, and Thorndike calls attention to the fact that Bacon did not mention Alphonso X of Spain who was interested in occult science. He was, according to this author, “jealous” of his contemporaries and eager to obtain the help of the Pope in order that “I, poor fellow, may gather the falling crumbs I need” (p. 642).

He also occupied himself with the early teaching of children, objecting as he did to the bad Latin verses in which the Scriptures and the *Metamorphoses* of Ovid had been presented to them. He taught that education should be undertaken by those who recognize its advantages. He would not banish from education the fruits of pagan antiquity, praising Seneca whom he greatly admired, and who had a marked influence on his genius.

The greatest discovery of Roger Bacon (according to Charles) was that of the weaknesses and faults of scholasticism. Among these defects were lack of observation, interminable discussions on idle or insoluble questions, discredit of certain sciences, forgetfulness of the great monuments of antiquity, and the unsatisfactory translations of the classics.

If Bacon did not separate theology and philosophy, it was because he viewed them as interdependent studies forming an alliance. He regarded them as two separate rays of the same brilliance, and he saw a revealed truth wherever a great philosopher has spoken.

In order to dissociate himself from the scholastic thinkers of his century, Bacon's original mind appears to have instigated the notion that he would belong as little as possible to that century. He was the first to pronounce the word "experiment"—a word necessary to the investigations of those very sciences, chemistry and alchemy, condemned by the schoolmen. He felt that through lack of personal initiative and experience, and through reliance on authority, there had arisen stagnation and the suppression of original thought. Consequently his message was that "Wisdom is dead; the demon has spread his shadows over the world".

Consequently also he emphasized the necessity of teaching to children all the knowledge of the most renowned philosophers.

Charles attributes the revival of scholasticism largely to the knowledge of Aristotle, and of the Arabian doctors, to whom Bacon owed so much.

It is not possible here to trace the intricacies and ramifica-

tions of scholastic arguments. Suffice it to say that they related to such questions as the nature of substance and to whether the matter of which a thing is composed, or its form, makes it the thing it is. For instance, does a sphere of brass owe its nomenclature to the material of which it is made, or to the shape (form) in which it exists?

Bacon opposed with strength the notion of the infinity and eternity of matter, which would make matter equal to God, "which is absurd".

Another problem of the schools related to the force which determines the union of matter and form. The answer was in some cases "movement", in others "generation".

If it be true, as Charles affirms, that Bacon believed that privation,¹ that is absence of qualities, is the essence of matter, he may have been nearer the facts than is generally supposed, in view of the modern scientific statements as to atoms and electrons.

A further question concerned the general and the particular, and whether the universal or the individual is the more important. Charles claims that Bacon took up a mean position between the two extremes of realism and nominalism.²

Discussions took place with regard to the vegetative, sensitive and intelligent soul of man, and it appears that Bacon attributed man's possession of the latter—i.e. reason—to the immediate action of God. In his belief in active intelligence, Bacon followed Aristotle and Averroes, maintaining

¹ Dr. Franz Hartmann, quoting H. P. Blavatsky, states that the *Yliaster* of Paracelsus corresponds with the *Ev* of Pythagoras, and that Aristotle was the first to speak of the form *in potentia* before it can appear *in actu*—the former being known as "the privation of matter". See Dr. Hartmann's *Life of Paracelsus*, Second edition, London. Kegan Paul, Trench, Trubner & Co., Ltd. 1887.

² Nominalism was the doctrine that general terms have no corresponding reality, either in or out of the mind, being mere words (*Chambers's Twentieth Century Dictionary*, London). Nominalism was opposed to Realism, which was the medieval doctrine that general terms stand for real existences.

that Robert of Lincoln, Adam Marsh, and "all great clerks in the world" hold this opinion. (*Opus tertium*, Introduction, Chapter XXXIII, MS. London.)

For Bacon, morality found a place amongst the sciences, and he termed it "the best and most noble of them all". (*Communia naturalium*, Chapter I.) For him "the moral act alone renders us good or bad; it alone is concerned with virtue and honour" and to him "theology and morality have the same object although their methods may be different". (*Opus tertium*, Chapter XIV.)

In a fine passage on p. 98 of his *Life of Bacon*, Charles points out the greatness of Roger Bacon in the following directions. "There is no great merit in our day in discovering the weakness hiding behind apparent grandeur . . . but such discernment was less easy to a contemporary [of the events of which he treated] to be witness of a great movement without applauding it, to be brought up with certain ideas and to reprove them, to resist contagion by living in the remembrance of ancient good, or by bold predictions of the centuries to come; all this could not be the achievement of a mediocre mind, nor of a feeble character; and above all [it should be remembered that] the accusations that for three centuries have been raised against scholasticism, were murmured for the first time in the silence of a cloister, by a doctor of the schools, by a monk clothed in the robe of St. Francis, by a philosopher who was a contemporary of Albert and of St. Thomas: his protest remains in its entirety, and the anger of his enemies has not been able to obliterate them. . . . With one hand he has tried to overthrow the ancient edifice; with the other, he has traced the design of a new monument".

According to Charles, another merit of Bacon is in having been one of the founders of sacred criticism. His works swarm with dissertations on the origin of the versions of the holy books, and the translations employed by the church. Bacon respected greatly St. Jerome, considering his translation better than all other Greek or Latin versions, of which,

therefore, a revised translation should be made. "The ancient Bibles in monasteries have been spared and have not received glosses; they contain unaltered the translation that the Holy Roman Church has adopted, and which was laid upon all the churches, but the copy which is in Paris resembles them in nothing; one must then correct it so as to conform to the ancient texts." (*Opus tertium*, Chapter XXV, cf. *Opus minus*, p. 49.)

Regarding astronomy, Charles alleges that Bacon made himself the historian of previous systems, before deciding his own position as to the movements of the heavenly bodies. Among these were Ptolemy, and Arzacher, the author of the *Tables of Toledo*,¹ and the imitator of his predecessor whom Charles names Thébit,² and finally Alpetragius.

Writing of scholastic physics, Charles records that Bacon claimed to have invented a science of which most scientists were ignorant, and which he found difficult to name, terming it eventually "the multiplication of species".³ No one taught him this at Paris, and without it (he claimed) one can know nothing of nature. It treated of the action of all natural forces, below as in the spheres above, being the first and a remarkable attempt to formulate a true science of physics.

The essay is incomplete and obscure and not without mistakes, so that historians have deigned neither to read nor understand it, though it must be considered one of the incontestable glories of Bacon, which seems to justify his cry:

¹ *Thorndike, op. cit.*, 638, states that Bacon employed "the Toletan astronomical tables of Arzachel", instead of the tables of 1252 called Alphonsine after the monarch who in that year began to reign.

² THÉBIT BEN CORAT was born about A.D. 836 in Mesopotamia, spent much time at Baghdad, and died about A.D. 900. *Thorndike, op. cit.*, 661, states that he wrote in Arabic and Syriac, but that he was not a Mohammedan. He quotes Roger Bacon as having considered him "the supreme philosopher among all Christians, who has added in many respects, speculative as well as practical, to the work of Ptolemy". *Thorndike's* reference is to *Bridges*, I, 394. *Thorndike* states further, p. 665, that Thébit has been quoted by other writers as an authority on images.

³ *De multiplicatione specierum.*

“This science is worth a hundred times more than all they know. Its greatness consists in the justice of its viewpoint, and the conception of a great idea, into the laws and universality of phenomena.”

Bacon did not neglect the study of plant life, believing that plants possessed the power of inspiration and respiration, and of waking and sleeping. He recognized the importance of their different parts and wondered (like Professor Bose in modern times) if vegetables had not some organ corresponding to the heart in animal life.

Charles is of opinion that alchemy alone has contributed more than all the sciences together to save the name of Bacon from oblivion. All the adepts of the Great Work count him as one of those who have performed transmutation, and arrived at the perfection of this art, so rarely attained. One has only to open libraries of alchemy to find the name of Bacon at the head of works dealing with this subject, and his *Mirror of Alchemy* has been through many editions.

According to Charles, the art of alchemy consists in finding the way to purify metals, and this is done by an elixir of which Bacon gives the composition, although after describing the vessel, the furnace and the colours of the liquid projection, he seems to have forgotten to tell us exactly what it is composed of.

Historians attribute to Bacon the discovery of phosphorus, manganese, bismuth, the properties of antimony, as well as a number of works to be found by consulting the library of Pierre Borel. Bacon claimed that only three men in the world knew practical alchemy and that one scientist alone was fully acquainted with all these questions; doubtless a reference to Master Peter.

The composition of gunpowder is often mentioned in Bacon's works but things of greater human interest are contained in a little treatise which has often been printed under different titles, the object of which is to show the power of human thought in directing the forces of nature. In the larger treatise entitled *De communibus mathematicae* the

same statements are found with the same strange admixture of truth and error. Charles's comment upon it is that "It is a dazzling picture, and one to confound modern science which believes itself born yesterday".

Among these marvels are flying machines and an object of the length of three fingers, and of an equal height, which instrument was used to raise or lower incredible weights without fatigue; also an apparatus for walking at the bottom of the sea and rivers without danger; instruments for swimming and resting on the water; bridges over rivers, without columns and without piles, and other similar wonders.

Charles quotes Bacon as writing of the flying machine, "I have not seen it. I know no one who has seen it, but I know perfectly the wise man who has invented this procedure." He added that the invention which permitted one to descend into the depths of the waters had been used by Alexander the Great,¹ and that the carriages which could roll along without horses had been used by the ancients. (*De mirabili*, p. 42.)

One must award to Bacon a knowledge of attraction (see Charles, p. 305) and in the *Opus majus*, Part VI, Bacon described an experiment as easy, having himself performed it. "Cut a branch (or twig) of hazel in two; separate the two ends, and you will soon feel the two isolated parts stretching themselves out to approach one another; you will perceive the effort that they make." His achievements are summed up by Charles in these words: "He has discovered a fact more important than a property of nature . . . that is to say a method." He added that regarding what he considers

¹ *Thorndike*, *op. cit.*, twice mentions the reference by Bacon to Alexander's attempt to explore ocean depths as related by Ethicus. (*De natura rerum*, II, 23.) In a footnote he describes a thirteenth-century manuscript (CU Trinity 1446, A.D. 1250, fol. 271). *Coment Alisandre vesqui sur les ewes* in which are three representations of the "submarine". One depicts Alexander with three men in a vessel under the water; in another he is shown with two men, the water containing a mermaid and fish, while in the third the ship is seen without visible passengers. See pp. 263, 655.

Bacon's many mistakes, "he was the victim of his own qualities . . . Bacon becomes credulous through science, and is led into error through his very passion for truth".

The greatest genius of the thirteenth century, "Bacon was prepared to reform the science of his time, by studying its sources, and as he desired to hasten future progress, he did not disdain the lessons of the past".

From the philosophers of the Middle Ages, Bacon quoted few names and few works; rather had he criticism for Anselm, Hugh and Richard of St. Victor, Peter Lombard, Alexander of Hales, Albert the Great and Richard of Cornwall. He mentions a Master Hugo¹ who introduced into the learning of the day a work called *The Second Analytics*.

Of the many Johns who were living at the time, Jean de Garlande was a grammarian. Charles also makes the point that when Bacon speaks of a science, he sets himself the task of relating its history and of the men and of their works connected with it, and it is thus that Jean de Garlande and Alexander Necquam are honoured for their knowledge of grammar.

Among the many mathematicians mentioned by Bacon was the Venerable Bede, whilst among the masters of antiquity occurs the name of the famous alchemist Trismegistus.

The *Elements* of Euclid had been translated by Bacon's compatriot Adelard, whose work he cites.

A long passage from the *Opus minus*, quoted by Charles on page 51, shows the spirit of Bacon bursting forth in indignation against the general corruption of his day.²

"One finds it in every town, in every village, in every camp; but at the same time there is a corruption and a debasement of character which renders all efforts futile. Let us consider all ranks of society, and we shall find

¹ In a footnote, Charles informs us that "authors speak little of this person".

² See also the views of Adelard of Bath as quoted by Thorndike, *op. cit.*, 22.

everywhere an infinite corruption beginning with the highest level. For in the court at Rome, where formerly reigned, as it should, the wisdom of God Himself, the right of the laity now prevails, thanks to the constitution of the emperors—that right which is based on civil law and should regulate laymen only. So this Holy Seat is a prey to crime and falsehood, justice perishes there, peace there is violated, pride reigns there, avarice burns there, greed there corrupts morals, envy gnaws all hearts and luxury there dishonours the whole papal court, and this is not enough: the vicar of God must be disowned by the indifference of his church, so that the world is left without guidance, with the result that for many years the Holy Seat remains empty, thanks to the efforts of jealousy and ambition! The priests, in their turn—consider how eager they are to enrich themselves indifferent to the care of souls, busy in promoting their nephews, their friends according to the flesh, or even lawyers—whose counsels overturn the world. As for those who pass their lives studying philosophy and theology, the priests cover them with contempt; they take from them all liberty and prevent them from acting for the salvation of souls. The monks, in their turn, are no better and I exempt no Order, *null ordinem excludo*. See indeed how far they are from the spirit of their institutions, how much the new Orders have lost by terrible attacks their primitive dignity! This body of clerks is a prey to pride, luxury, avarice; everywhere where they are numerous as in Paris and Oxford, they scandalize the ordinary people by their arguments, turbulence and all other vices. . . . As for us Christians, we make no discovery; we do not understand even the wisdom of the ancients; the corruption of manners and of studies are jointly responsible; man is in science what he is in life . . . the corruption of the clergy is the origin of the ignorance of men.” (*Opus minus*. Cotton Library, Chapter I, p. 121.)

A passage in the *Opus minus* throws light upon Bacon's idea whereby this universal corruption should be overcome. "God has already chastised his church; now it is necessary that a great pope aided by a great prince—the sword of Mars united with a spiritual sword should purge the church, or else she will be punished by Anti-Christ; by some violent revolution, by the discord of Christian princes, by the Tartars, the Saracens or the kings of the East." (*Opus minus*, Cotton Library, Chapter I, i, 121.)

IV Life at Oxford in the Time of Bacon

WE are indebted to Andrew G. Little¹ in his *The Grey Friars in Oxford* for some idea of the University life in the thirteenth century.

The first Provincial of England "said to have been appointed by St. Francis in 1219" had been custodian in Paris and was named Agnellus. He probably arrived in England about September 1224, when a deacon of thirty years of age. He landed at Dover and proceeded to Oxford where he upheld the primitive poverty of the Rule, only permitting houses to be built where this was an absolute necessity.

Agnellus rendered the greatest service to his Order—the Franciscans—by persuading Robert Grosseteste, the foremost scholar of the time, to accept the post of Lecturer to the Friars. He resided in Oxford, 1234, and gave up his lectureship to become Bishop of Lincoln in 1235. His successor was Master Peter. (See Appendix III, p. 122.)

All these men were seculars, not friars. It was important "at a time when", as Roger Bacon said, "the Order of Minors was new and neglected by the world, to secure the service of men of recognized position and ability".

Grosseteste, in lecturing to the Franciscans, may have employed the method of using the Old and New Testaments as the foundation of their doctrines, and this enables us to understand why Bacon lamented the exaggerated respect which was paid to the "Sentences"² in his day and pointed

¹ Andrew G. Little, M.A., *The Grey Friars in Oxford*. (Oxford. Clarendon Press. 1892.)

² This was the name given to the principal work of Peter Lombard [circa 1100–1164] Bishop of Paris, consisting of a discussion of points

out that the learned men of the period, such as Robert, Bishop of Lincoln and Friar de Marisco, used only the text which was given to the world from the mouth of God and of the Saints. (*Opera inedita*, 329.)

We are informed by Little that the Rules of the two Orders—Franciscans and Dominicans—forbade their members to take a degree in Arts, which statement he bases upon Bacon's own writings. (*Opera inedita*, 426.)

The custom of the University, on the other hand, required that the student of theology should have graduated in Arts, which custom produced a feeling of inferiority in the members of the Orders, so that the issue was raised in 1253 and has been described by Adam Marsh. The immediate question was that of the appointment of Friar Thomas of York to the position of "Regent¹ in Holy Scripture". Objection was raised that he had not graduated in Arts. This objection was overruled in his case, but it was decreed by statute that no one should seek such "a grace" through the influence of powerful patrons, becoming by this means a so-called "Wax-doctor", from the "wax" used by lords to seal their letters. Thus the friars were obliged to take preliminary training before they could hope to "incept in theology".

Roger Bacon wrote on this subject in 1271:

"During the last forty years there have arisen some in the universities (*in studio*) who have made themselves doctors and masters of theology and philosophy, though they have never learnt anything of any value. . . . They

of Christian doctrine expressed as objection and reply. Peter was called *Magister sentiarium*, that is, the Master of Sentences. This work was the subject of a commentary in three volumes by Albertus Magnus.

¹ Regent Masters appear originally to have been those who for two years after their degree held a school in Grammar, or any other Faculty at Oxford. The house where they met was called the Regents' House. (See Adolphus William Ward, Litt.D., *Old English Drama*, fourth edition. Oxford. Clarendon Press. 1921. First edition. 1879. Impression of 1927.)

are boys, inexperienced in themselves, in the world, in the learned languages, Greek and Hebrew. . . . They are ignorant of all parts and sciences, of mundane philosophy, when they venture on the study of theology, which demands all human wisdom. . . . They are the boys of the two student Orders like Albert and Thomas, and others who enter the Orders when they are twenty years old or less. . . . Many thousands enter who cannot read the Psalter . . . and immediately after making their profession, they are set to study theology . . . and so it was right that they should make no progress, especially when they did not procure instructors for themselves in philosophy from others after they entered the Order. And most of all because they have presumed in the Orders to investigate philosophy themselves without a teacher—so that they have become masters in theology and philosophy before they were disciples—therefore infinite error reigns among them.”¹

Little points out that friars were practical workers and that Bacon shows this in his writings, p. 63. “Before all, the utility of everything must be considered, for this utility is the end for which the thing exists. . . . The utility of philosophy is in its bearing on theology and the church and state and the conversion of infidels and the reprobation of those who cannot be converted. . . .

“The end of all sciences and their mistress and queen, is moral philosophy, for this alone teaches the good of the soul.” (*Opera inedita*, pp. 19, 20.)

Little further indicates that the Franciscans made use of their philosophy in everyday life. He quotes Bacon as saying, “It is the first step in wisdom to have regard to the persons to whom one speaks. . . . (*Opera inedita*, lvi.) He goes on to cite Brewer² that the brethren followed Roger’s advice,

¹ Little, *op. cit.*, 42 (*Opera inedita*, pp. lv and 399).

² Professor John Sherren Brewer [1810–1879] edited, as the result of his work in the Record Office, the *Monumenta Franciscana*, 1858, and the works of Roger Bacon, 1859.

“their sermons being full of fitting stories and racy anecdotes with mention of popular tradition and legend and illustrated by allegory or fable”.

In Paris Bacon lectured to Spanish students who are said to have laughed at his discourses. (See Little, *op. cit.*, 66.)

Bacon's statement in *Opera inedita*, p. 12, that “he could only get a fair copy of his works made for the Pope by writers unconnected with the Order” meant, according to Little, that there were no professional scribes among the Minorites of Paris (p. 86).

It was often the custom for friars to resort to begging to obtain the necessary means for their studies. Writing to the Pope, Bacon complained:

“But how often I was looked upon as a dishonest beggar, how often I was repulsed, how often put off with empty hopes, what confusion I suffered within myself, I cannot express to you. . . . Even my friends did not believe me as I could not explain the matter to them; so I could not proceed in this way. Reduced to the last extremities, I compelled my poor friends to contribute all that they had and to sell many things and to pawn the rest, often at usury and I promised them that I would send to you all the details of the expenses and would faithfully procure full payment at your hands. And yet owing to their poverty I frequently abandoned the work; frequently I gave it up in despair and forbore to proceed; . . .” (pp. 91, 92).

Little suggests that the “*amici*” (friends) were “poor students of the common people (so-called)” and he adds in a footnote that complaint was made that the friars “devour poor men's alms in waste, and feasting of Lordes and great men” (p. 92).

Of Bacon's friend, Adam Marsh, Little relates the following facts: Born in the diocese of Bath, he studied at Oxford under Grosseteste, who had been interested in him from an early stage of his life. Bacon called Grosseteste Adam's

“master”. (*Opera inedita*, 167.) Adam’s uncle Richard, Bishop of Durham, appointed the nephew to a living near Wearmouth, and in 1226 left him his library. By this time Adam was probably a Master of Arts, but soon after he gave up “all worldly greatness and a large income”, to become a Franciscan at Worcester, “through zeal for greater poverty”. From here, he went with St. Anthony of Padua to the University of Vercelli; and may have returned to Oxford to attend Grosseteste’s lectures to the friars. He became one of the greatest of the Minorites and a leading light of the Church, and in 1203 Grosseteste bequeathed to him his library. His most famous pupil was Roger Bacon, who declared him to be “perfect in all wisdom”. (See Little, pp. 134–9.)

Amoury de Montfort was papal chaplain and Treasurer of York. In his will one-third of his bequest was to be divided into six parts; this sixth was to be subdivided into three, one of which was to go to the Friar Preachers of Oxford, Leicester and other places (pp. 102–3).

Little denies that Bacon’s pupil, John, was either John of London or John Peckham. He was “a virgin, not knowing mortal sin, and an excellent keeper of secrets”. (*Opera inedita*, 62.)

Little quotes in full in a note (p. 73) Bacon’s opinion of Thomas Aquinas. “Truly I praise him more than all the crowd of students, because he is a very studious man and has seen infinite things and had experience; and so he has been able to collect much that is useful from the sea of authors.” However he was handicapped by not going through the regular training (p. 327). His followers maintain that philosophy as published in his works is complete. “These writings”, Bacon continues, “have four sins; the first is infinite puerile vanity; the second is ineffable fatuity; the third superfluity of volume . . . the fourth is that part of philosophy of magnificent utility and immense beauty and without which facts of common knowledge cannot be understood—concerning which I write to your glory—have been omitted by the author of these works, and therefore there is

no utility in these writings, but the greatest injury to wisdom.”

Thus the “unnamed professor at Paris” referred to by Roger Bacon, has been identified by Dean Plumptre with Aquinas. (*Contemporary Review*, II, 375.)

Another contemporary whose errors Bacon condemned in 1292 was Richard Rufus, of Cornwall, a master, probably of Arts, who was a Minorite at Paris. Adam Marsh appears to have been less hard on this friar.

Little, in this connection, charges Charles with inaccuracy, as also the Royal Manuscript in the British Museum. (7 F. vii folio 81.)

Little asserted that “very little” is known of Thomas de Bungay, of Suffolk, regarded later as a conjurer. He may have entered the Order at Norwich and was lecturing as Doctor of Divinity in a Franciscan convent at Oxford about 1270. He appears to have stressed the importance of mathematics, which view Bacon shared. He also lectured to the Franciscans of Cambridge and was the eighth Provincial Minister, being succeeded by Peckham. “According to the catalogue of illustrious Franciscans he wrote a Commentary on the *Sentences*.” Only one of his works appears to have been printed, but Little compares the MS. Caius College, Cambridge (509, paragraph 3, section xiv ineuntis) with a MS. in the Bibliothèque Nationale, Paris (1644, sec. xiii, p. 240).

Little quotes Charles in a footnote to page 215 in treating of William de la Mare or de Mara—a disciple of Bonaventura—that “the serious part of his work seems directly inspired by Bacon”. Little adds that no doubt William de Lamarre, as Charles termed him, “had come under Bacon’s influence either at Oxford or Paris”.

The work in question, taking the form of an anti-Aquinas criticism, was published in 1284.

An astronomer, by name John Soomer, from the convent at Bridgwater, was at Oxford in 1380. It is said that he “made use of the astronomical researches of Bacon”, and Little

compares his reference to the corruption of the Calendar to Roger Bacon's *Opera inedita* (p. 272).

In the biographical notice of Bacon in Little's *The Grey Friars in Oxford* it is first of all stated that the authority for Bacon's birth at Ilchester was John Rous. (Ilchester is said erroneously to be in Dorsetshire.)

Since boys of ten or twelve years often began their studies at Oxford, Bacon may have been sent there early. We are told that both Grosseteste and Aquinas understood and sympathized with the "experimental method". Bacon wrote, "When I was in another state I wrote nothing on philosophy. Men used to wonder before I became a friar that I lived owing to such excessive labour." (*Opera inedita*, pp. 13, 65.)

It was in the same work and page (65) that Bacon had written, "I have laboured much at sciences and languages, and it is now forty years since I first learned the alphabet; and I was always studious; and except for two of those forty years I have always been *in studio*."

By 1267 Roger had spent "more than 2000 *librae* on secret books and various experiments and languages and instruments and tables". (*Opera inedita*.)

In the same work (p. 325) Bacon relates that he had seen Alexander of Hales with his own eyes, and had heard William of Auvergne "dispute before the whole University". (1750 edition of the *Opus majus*.)

The 1750 edition of the *Opus majus*, p. 190, contains Bacon's statement that he saw the chief of the Pastoureaux and noticed that "he carried in his hand something as though it were sacred, as a man carries relics".

Rous in *Hist. Reg. Ang.*, p. 82, states that Roger Bacon became Doctor of Divinity in Paris and incorporated Doctor of Divinity at Oxford.

It was the clerk Rémond de Laon who mentioned the name of the imprisoned friar to the Cardinal Bishop of Sabina, afterwards Pope Clement IV.

Little shows that Clement's supposition that Bacon's great works were already written was incorrect, and quotes Bacon

as writing in *Opera inedita*, p. 13, "Whilst I was in a different state of life, I had written nothing on science; nor in my present condition had I ever been required to do so by my superiors; nay, a strict prohibition has been passed to the contrary, under penalty of forfeiture of the book, and many days fasting on bread and water, if any book written by us (i.e. the Franciscans) should be communicated to strangers."

Little supplies in a footnote the information that this statute was passed in 1260 at the General Chapter at Narbonne, and that the fast lasted three days (p. 192).

Bacon wrote further of his brethren and superiors that they "kept me on bread and water suffering no one to have access to me, fearful lest my writings should be divulged to any other than the Pope and themselves". (*Opera inedita*, p. xciv from Wood's *Antiquitates* (said to be taken from the *Opus minus*.)

John Rous was the authority for the statement that Bacon was buried among the Friars Minor at Oxford. In Royal MS. 126, folio 152, on the death day of Roger Bacon, said to have been 11 June, the Feast or Festival of St. Barnabas, John Twyne recorded that the friars fastened all Bacon's works with long nails to the shelves of their library and left them there to rot.

Little quotes the historian Leland as remarking that, "it is easier to copy the leaves of the Sybil than the titles of the works written by Roger Bacon".

Little says that they were regarded with a pious horror in the Middle Ages. Earliest MS. 1263-4, *Computus naturalium*. He also states that a Calendar has been wrongly attributed to Bacon, having been made by a Minorite at Toledo in 1297 and taken from the *Tabulae Toletanae*, p. 209.

A lecturer to the friars whom Bacon ranked among "the wise men of old" (*Opera inedita*, 88) was Master Thomas Wallensis, who studied foreign languages and knew the value of philology. He became Bishop of St. David's in 1247 out of a desire to help his countrymen.

The author of *The Grey Friars* has given us some idea of

their lives at Oxford, the two first having arrived in 1224. At first the Rule of St. Francis was kept strictly; the friars' quarters being poor and they themselves attired in a coarse grey or brown robe—more or less threadbare (as Grosseteste loved to see them), and with bare feet, shoes being permitted only to the infirm and old by special licence (p. 4). Pillows were not allowed. Grosseteste advised the Minorites "to eat, sleep and be merry".

Very soon the Franciscans became imbued with the desire for learning, their lecturers being Regent Masters of the University. The average number of friars living in the convent of Oxford during the last quarter of the thirteenth century, Little estimates to have been seventy or eighty.

He points out that although Brasenose College and Merton College have claimed Roger Bacon as a student, this is incorrect, as Merton was not founded till Bacon was quite old, and Brasenose till two hundred years after his death.

V Philosopher and Scientist

“EVEN if a man should live for thousands of centuries in this mortal condition, never would he attain to the perfection of knowledge; he would not know to-day how to explain colour, nature, the existence of a fly, and he himself finds presumptuous doctors who believe they have achieved philosophy.”

Thus wrote Bacon in his *Computus naturalium*. (First part, Chapter II.) Writing to Pope Clement IV he explained that some sciences may be taught openly, but he concludes “as for others they are more secret; one must not reveal them to the crowd who can make bad use of them”. (*Opus tertium*, Chapter I.)

Treating of Roger Bacon as an alchemist in *The Gold-makers*, the author, K. K. Doberer, ascribes to this philosopher the confession that more “secrets of knowledge” had been revealed to him by “plain and neglected men” than by celebrated instructors (p. 45). Another claim of Bacon referred to by the same writer, was that the attempts to make gold had brought many “useful inventions . . . to light” (p. 46).

All kinds of weird and wonderful discoveries have been attributed to the monk of Oxford, but Charles will have none of them, after explaining that he had searched the works in vain, although animated with the keen desire to find them. He could find no traces of telescopes, flying machines, or other marvels often associated with the inventor’s name, and he points out that Bacon is great enough to do without such novelties, references to which are based on obscure passages, or which have accrued, like barnacles, to his reputation.

It is true that his work on Optics was considerable, and

there is a passage in the *Opus majus* which may be a mention of gunpowder, not unknown at this period.

The author of the article on Alchemy in the *Encyclopædia Britannica*, eleventh edition, states that Roger Bacon, or another of the same name, performed transmutation, but there is no such admission in the biography of Charles, whose tendency was to discredit unusual occurrences. He states that Bacon's errors are many, and he attributes these errors to his scientific ardour, which, we are informed, involved him in illusions, especially alchemical and astrological.¹

As an example of such an illusion, Charles affirms that Bacon thought men aged and died prematurely, and he believed in an electuary, into the composition of which there entered potable gold, herbs, flowers, spermaceti, aloes and the flesh of a serpent, which belief lowers the eminent philosopher to the level of those who give marvellous recipes, and of empirics, ignorant or fraudulent. He refers us to page 472 of the *Opus majus*.

Charles devotes a chapter to Bacon's erudition and to the sources whence it was derived. Besides Aristotle, Bacon owed much to the Arab philosophers, Avicenna and Averroes. He was ready to criticize them when it seemed necessary. An author whom Bacon greatly admired was Seneca, whose *Sentences* he often quoted. Seneca's love of science, respect for reason, faith in progress and in the future, and his pre-

¹ *Thorndike, op. cit.*, 256, records Bacon's appreciation of a treatise on astrology *De impressionibus caelestibus* which was ascribed to Aristotle and of which Bacon reported to Pope Clement IV that it was "superior to the entire philosophy of the Latins and can be translated by your order". (Bridges (1897), I, 389-90; Brewer (1859), 473.) Another contemporary to whom Bacon made allusion was Michael Scot, astrologer to the Emperor Frederick II, whose dates are uncertain, but who was writing between 1198 and 1216. According to Thorndike, Bacon regarded Michael as "a notable inquirer into matter, motion and the course of the constellations" and one who "understood neither sciences nor languages, not even Latin". The reference is, in one case, to Brewer (1859), 91.

dilection for morality, appealed strongly to the thirteenth-century philosopher.

After Seneca, he cites Cicero and other names of antiquity. Named by him are Democritus, Xenophon, Empedocles,¹ Plato and others. Arabian philosophers cited are Algazel² and Alph-arabius.³ It goes without saying that he was acquainted with the philosophical thought of his day. The translators of ancient works are severely blamed by Roger Bacon for their ignorance and the bad quality of their labours—the transcription of ancient works into scholastic versions.

The only exceptions are Boethius⁴ and Robert of Lincoln. Mathematicians known to Bacon were Hipparchus,⁵ Archimedes, Ptolemy and Euclid. But he asked why Christians should be so disdainful of this science, and so ignorant of the works of antiquity. He reiterated his belief in the “profane theology” of Greeks, Romans and Mohammedans, and in the wisdom of paganism. He did not separate politics from the sphere of morality and declared that the roots of morality spring from metaphysics, which itself resembles theology in its first principles, but has regard in its second part to man’s relations with his fellows, and the third part treats of man’s duties towards himself, in living an honest life, apart from evil customs. In Bacon’s own words, the fourth function of morality is “to prepare man for clerical life according to the

¹ A philosopher, physician and magician, who lived about 450 B.C.

² ALGAZEL or GHAZZALI [958–1111], was a Mahommedan who taught at Mecca, Jerusalem, Damascus and Alexandria. His three principal works dealt with the opinions, the tendencies and destruction of the philosophers.

³ ALPH-ARABIUS, A., was a philosopher of the Khirghiz steppes, born near the River Oxus, who made many travels before he met his death at Damascus.

⁴ BOETHIUS was a Roman philosopher, born *circa* A.D. 470, who knew Greek and translated Aristotle, being also an authority on arithmetic, astronomy, geometry and music.

⁵ HIPPARCHUS, [*circa* 160–125 B.C.] born at Nicaea, was a famous astronomer who observed the heavens from the island of Rhodes. It was he who formulated the length of the solar year.

light of reason". The fifth consists in preaching observation of the practices and duties of true religion, while the sixth deals with the administration of justice.

By Grammar, Bacon meant more than our word, including, as it did, the origin of language and renewed search for the original language. Bacon was also one of the founders of criticism applied to the Scriptures, and his works swarm with dissertations on the origin of the Holy Books and their translations.

The only mathematical work extant is *De communibus mathematicae*, which, as its title implies, contains only general principles.

In his work on Mathematics, Roger Bacon says:

"Nobody can attain to proficiency in that science by the method hitherto known, unless he devotes to the study thirty or forty years, as is evident from the case of those who have flourished in those departments of knowledge, such as Lord Robert of holy memory, sometime Bishop of Lincoln and Friar Adam Marsh, and Master John Hendover, and the like, and that is the reason why so few study that science." (See Francis Seymour Stevenson, *Robert Grosseteste, Bishop of Lincoln*. (London. Macmillan & Co., Ltd. 1899, p. 51), and *Opus tertium*, 472. (Quoted from Wood, I, 82.))

On the same subject he says in the *Opus majus* that:

"There were found some famous men, such as Robert, Bishop of Lincoln, and Adam Marsh and several others, who were aware that the power of mathematics is capable of unfolding the causes of all things, and of giving a sufficient explanation of human and divine phenomena; and the assurance of this fact is to be found in the writings of those great men, as for instance in their works on the rainbow and the comets, on the generation of heat, on the investigation of geography, on the sphere, and on the questions appertaining both

to theology and to natural theosophy." (P. 52, *Opus majus*. Ed. Jebb, p. 64. Ed. Bridges, I, 108.)

There are remains of quite a considerable number of Bacon's works on Astronomy, of which *De caelestibus* is not without interest. It appears that Bacon's ideas of the universe were not wholly those of Democritus, but he maintained that the universe is composed of separate bodies, complete and capable of division, rather than of indivisible atoms which are infinite in number. To the four elements he added a fifth—the sky.

With regard to Chronology, Bacon indicated that the Hebrews knew only the lunar months, while the Arab calculation is less than that of Bacon himself, which is 29 days, 12 hours, 44 minutes. Most biographers agree that Bacon was the first to have the idea of the reform of the Calendar,¹ not realized till three centuries later, under the papacy of Gregory XIII.

The *Opus majus*, *Opus tertium* and the *Computus naturalium* in the Bacon manuscripts, throw the most complete light on this subject. Bacon realized that the actual Calendar showed incorrectly the new moon, since in 76 years the new moon advanced on the period fixed by the Calendar 6 hours, 40 minutes, so that at the end of 386 years there would be an error of a whole day. This idea is discussed in *Computus*, *Opus majus*, pp. 170–82, and in *Opus tertium*, Chapter LV. The conclusion is that "A reform is then necessary. All people educated in computation and astronomy know it and ridicule the ignorance of the priests who maintain the actual state [of the Calendar]. The infidel philosophers, Arabs and Hebrews, Greeks who live amongst the Christians, as in Spain and Egypt and other countries of the East and elsewhere, are horrified at the stupidity shown by the Christians

¹ *Thorndike*, *op. cit.*, 444, considers the *Computus* of Grosseteste, dealing, as it does, with Easter and other festivals, to have been a work stressing the need of Calendar reform, which was later made use of by Bacon.

in their chronology and celebration of their solemnities." Then follows an appeal to the Pope to give the requisite orders, so that a number of men might be appointed to remedy these faults. Bacon felt that should this work be accomplished "one would see one of the greatest enterprises finished, the finest, best and most beautiful which has ever been attempted in the Church of God".

Here is Bacon's statement with reference to yet another science. "Geography, like chronology and astronomy, has its roots in mathematics, since it would repose on the measure and the figure of the inhabited earth."

The determination of longitude and latitude, remarked Bacon, is so vast that only a pope or a king could accomplish it. The influence of the climate upon the various regions produces variations in production, character, etc., and this factor must be included in the study comprised in Geography. A long description of the earth may be read in the fourth part of the *Opus majus*.

Bacon did not accept the idea of Pliny that at the poles the climate was temperate; mathematical demonstration, he thought, proved the contrary. He recognized that at the poles the day lasts six months, as the solar rays are found reflected on the polished surfaces of mountains of stone; at certain times and in certain places it can be very warm there.

To gain such knowledge, Bacon made enquiries everywhere, talked with travellers and investigated narratives.

In the realm of Physics Bacon was assured that the ebb and flow of the tides had a connection with the lunar rays. He refuted atomism by an appeal to Euclid; he concluded that the form of the world is spherical.

It seems that Bacon was acquainted with the fact that the rainbow is nothing by itself, but a reflection of rays across the little drops of water in rainy clouds. He also had observed that the same effect is produced by analogous phenomena—in the dew, in water raised by oars or by a water wheel and in a crystal suitably cut. A very interesting allusion is to

“six-sided Scottish stones” which, if held directly in a beam of sunlight, show all the colours of the rainbow.

The sciences which investigate the mysteries of nature were not neglected by this indefatigable philosopher. He attributed to the members of the vegetable kingdom the so-called vegetative soul, and accorded to them inbreathing and respiration. While noticing the sap and various parts—stem, roots and bark, he endeavoured to find the rôle which leaves, flowers and fruit play in vegetation, and sought to find the essential organ which took the place of the heart. His theory regarding the propagation of certain creatures by division seems not unlike the modern cellular theory, since he attributes it to divisible parts of the creatures which are to them complete in themselves. It is not surprising that he accepted the idea of spontaneous generation in the putrefaction of organized matter.

Alchemy has contributed more than all other sciences, according to Charles, to save the name of Bacon from forgetfulness, as have, in the opinion of the French biographer, all the adepts of the Great Work who have performed transmutation. Bacon's *Mirror of Alchemy* contains in seven little paragraphs a manual of this art, which teaches how to compose a certain medicine called Elixir, which, when it is projected upon metals or imperfect bodies, makes them perfect at the moment of projection. The theory goes on to explain what constitutes an imperfect metal. One must know that all metals are composed of sulphur and mercury, but these two elements are more or less pure, and are only to be found without admixture in gold. All the art of alchemy consists in purifying these metals by means of an elixir, concerning which Bacon gives some of the details, describing the vessel, the furnace, and the colours which the liquid of projection presents.

Bacon called transmutation practical alchemy, the aim of which is to perform useful work for the State or the individual. Above this he placed speculative alchemy, the aim of which is usually to study the formation of bodies, the combination

of elements, and the nature of animals and vegetables.

Referring to supposedly inanimate objects—common stones, precious stones, marbles, oils, etc., Bacon declared, “There are not three men in the world who know the distinct uses of these things in practical alchemy. One only is instructed in all these questions, and as so few people can understand him, he does not deign to communicate his science to others, nor to associate with them, because he regards them all as fools.” (*Opus tertium*, Part I, Chapter 2.) This candid gentleman may well be, as Charles surmises, Master Peter.¹

In the same work, Chapter 5, Bacon cried, “In my opinion, my ideas on these principles and on their application to metals are worth more than the claim to know, of all the physicians in the world.”

According to the *Speculum* the *Breve breviarum* is to be placed among the alchemical writings attributed to Roger Bacon.

D. W. Singer² states that of the *Breve breviarum* only one copy exists of fourteenth-century date—the fifteenth-century MSS. being usually extracts. “This is a practical work in which observations and experiments are recorded and explained. It contains extracts believed by Bacon to form part of Aristotle’s *Memoirs*, but are from a passage of Avicenna, of which the translation of Alfred de Sareshull became attached to the version of Book IV of the *Memoirs*, made direct from the Greek.”

Roger Bacon believed that the *Secretum secretorum* was written by Aristotle for his pupil Alexander. Bacon also

¹ This PETER is called Peter Peregrine by the author of *The Gold-makers*, who states that he was a Franciscan, who, like Bacon, was suspected of scientific practices disapproved by the brotherhood of the Friars. He condemned blind faith, and taught that experiment alone could bring knowledge of all natural things. (See also VII, 40, below.)

² D. W. Singer, *Alchemical Writings attributed to Roger Bacon*. Notes. (See *Speculum*, *Journal of Medieval Studies*, Vol. VII, 80. Medieval Academy of America. Cambridge, Massachusetts. 1932.)

believed that the *Emerald Table of Hermes* described a process of distillation and sublimation (p. 81).

Robert Steele,¹ writing of Bacon, advances the suggestion that the thirteenth century was marked by the appearance of encyclopaedias which attempted to summarize all extant human knowledge, and he proffers such examples as those of Albertus Magnus and Vincent of Beauvais, to which he assigns a date between 1240 and 1264. This work, entitled *Imago mundi*, comprised three sections, named respectively *Speculum naturale*, *Speculum doctrinale* and *Speculum historiale*, to which an addition was the *Speculum morale*. Steele also makes mention of the encyclopaedia of Bartholomew Anglicus, a Franciscan whose work was named *Proprietatibus rerum*. His idea is that Bacon hoped to produce a similar encyclopaedic record, of which certain of his existing works are fragments. (See pp. 131-7.)

A second allusion occurs in Charles Singer's contribution to the same volume, this latter article being entitled "Steps leading to the invention of the First Optical Apparatus" containing a reference to Roger Bacon as "the father of microscopy". There is also a quotation from the *Opus majus*, Part VII, and one from *De secretis operibus* describing how "objects at a very great distance appear to be quite close at hand and conversely". Thus "small letters may be read from an incredible distance".

¹ Robert Steele, *Roger Bacon and the State of Science in the Thirteenth Century*. In *Studies in the History and Method of Science*, Edited by Charles Singer. (Oxford. Clarendon Press. 1921.)

VI Roger Bacon in Tradition and Legend

Our great Roger Bacon, by a degree of penetration which, perhaps has never been equalled, discovered some of the most occult secrets in Nature.

Isaac D'Israeli, *The Book of Authors*, 1.

NO account of Roger Bacon would be complete without reference to the many traditional stories associated with his name. These stories may be read in Volume I of *Early Prose Romances*, edited with biographical and historical introduction by William J. Thoms, F.S.A.

In his preface to "Friar Bacon", Thoms recalls that since "the tendency which has been shown by the generality of mankind in all ages and countries is to estimate the capabilities of the human mind by the limited powers which have been allotted to themselves, we cannot be surprised that they should endeavour to reduce the master-spirits of Genius and Philosophy to their own level by attributing the superior acquirements of such master-spirits to the influence of demoniacal agency. . . ."

He went on to assert that "Among the many that have been thus treated none has been more unjustly than Roger Bacon, who in the three first chapters of the Epistle on the Power of Art and Nature, expressly declares against magic, unlawful books and spells."

In the view of Thoms, the history of Friar Bacon, written towards the end of the sixteenth century, assembled the numerous stories current regarding the philosopher's extraordinary powers.

In Thoms' opinion narratives concerning the Brazen Head and the Perspective Glass are worthy of special consideration.

He stated that Butler associated "Bob Grostete of Lincoln with Old Hodge 'Bacon' who has been thus commemorated:

"For of the grete Clerk Grostete
I rede how busy that he was
Upon the clergie, on the head of bras
To forge."

(Volume II, 90 b. New edition of Gower, *Confessio Amantis*, Liber Quartus, edited by Dr. Pauli.)

We owe to William of Malmesbury in Dr. Giles' translation (Bohn's Antiquarian Library, p. 181), the record of the brazen head made by Gerbert, Pope Sylvester II, called "the Aquitanian".

It is said to have been cast, according to Thoms, "by a certain inspection of the stars when the planets were about to begin their courses". It did not speak unless addressed, when it replied truthfully "yes" or "no". Thus the answer to Gerbert's query "Shall I be Pope?" was in the affirmative, while a negative reply was given to the question "Am I to die ere I sing Mass at Jerusalem?" This "Jerusalem" appears to have referred to a church at Rome called The Station of Jerusalem, where the Pope sings Mass on three Sundays.

According to Yepes, a brazen head, made by Henry de Villeine at Madrid, was shattered at the command of John II, King of Castile, and the making of a brazen head has been attributed also to Albert Magnus. In this connection Thoms provides a footnote as follows: "Stow mentions a head of earth made at Oxford by the art of necromancy in the reign of Edward II, that, at the time appointed, spake these words: '*Caput decidetur*' (the head shall be cut off); '*Caput elevabitur*' (the head shall be lifted up); '*Pedes elevabuntur supra caput*' (the feet shall be lifted above the head)."

Thoms also quotes an extract from Sir Thomas Browne's *Vulgar Errors*, Book VII, Cap. 17. "Every ear is filled with the story of Friar Bacon that made a Brazen Head to speak these words 'Time is'."

The origin of the Perspective Glass is, according to

Thoms, the consequence of Bacon's skill in Optics, tradition leading him to believe that the philosopher was the inventor of the telescope. He states that the story of the three brethren was borrowed from the *Gesta Romanorum*, being the forty-fifth tale of the thirty-eighth folio, printed by Jehan Petit at Paris in 1506, while the narrative relating to the conjuring of Bacon's man, Miles, may have been taken from *The Friers of Berwick*, the author of which has been named as Dunbar, who died in 1525. This was printed in Pinkerton's *Scotch Poems*, Vol. I, 65.

Dubravius, *Hist. Bohem.*, records a contest similar to that between Bacon, Bungay and Vandermast, and Thoms informs us that the story was repeated by Flogel in *Geschichte der Hofmarren*, Seite 214.

Of the many editions of the *History of Friar Bacon*, Thoms states that the first was probably "printed in London by E.A. for Francis Grove". E.A. may be the initials of Elizabeth Alder, for whom the edition of Greene's play, *The Honourable History of Friar Bacon and Friar Bungay*, was printed in 1630. (Made by Robert Greene, Master of Arts, London. Printed for Edward White, 1594.)

Thoms ends his preface with the hope that the learned biographer of Jerome Cardan and Cornelius Agrippa may produce a life of Roger Bacon—the old English philosopher.

Here follows the title page as set forth in *Early Prose Romances*, Volume I, of

THE FAMOUS HISTORIE

OF

FRYER BACON

containing

The wonderful things that he did in his life;
also the Manner of his Death.

with the lives and deaths of the two conjurers,
Bungye and Vandermast.

Very pleasant and delightful to read.

Printed at London by E.A. for Francis Grove and are to be sold at his shop, at the upper end of Snow-Hill against the Saracen's Head.

Following upon the above title page, the first story relates how the priest who was young Bacon's tutor, advised the father to send his promising son to Oxford. The father, however, having intended Roger to follow in his own steps as a farmer, presented him with a cart-whip in place of his books, bade him "sow, reap, plough and sell graine and cattell".

Roger soon gave his father the slip, and continued his study in a neighbouring "cloister".

The second relates the marvellous entertainment provided by Friar Bacon for the king¹ and queen,² while the third introduces the friar's man Miles, who was cured by his master of his greed in eating a "black pudding" on a fast day.

The fourth tale reveals the astuteness of the friar in rescuing a gentleman who had given himself to the Devil, this astuteness causing much discomfort to the latter.

A fifth narrative concerns the Brazen Head, constructed with immense skill and patience by Friars Bacon and Bungay, in order that the Head might speak and enable Bacon to "wall England about with Brasse" to prevent future conquests.

Having raised a spirit to advise them how to make the Head speak, the friars, being very tired, instructed Miles to wake them if the Brazen Head should utter speech, and fell asleep.

The Head enunciated first the words "*Time is*"; on the second occasion the words were "*Time was*"; and on the third "*Time is past*", after which it fell down with noise and fiery flashes, thus waking its constructors from slumber. Much to their vexation, the friars heard from Miles the account of his negligence.

The next and sixth amazing undertaking was the capture

¹ King Henry III.

² QUEEN ELEANOR OF PROVENCE. Grosseteste's biographer also shows that Queen Eleanor of Provence exhibited much tact and judgment and quotes a letter from the Bishop of Lincoln to the Queen rejoicing in her "kindness, goodness and virtue" towards her household. (Stevenson, *op. cit.*, 212.)

of a "towne" in France by the English king through means of instruments which Friar Bacon caused to be erected on a mound, after which the State house of the said town was set on fire, with the result that the town was occupied, whilst its denizens were trying to put out the conflagration.

The seventh story relates how, as a consequence of the clemency of the English monarch, the French ambassador sought to entertain him after a banquet by the performances of a German conjurer, Vandermast who raised the supposed spirit of Pompey. Friar Bacon's reply was to raise Caesar, who vanquished Pompey, after which Friar Bacon brought the Hysperian Tree guarded by a dragon. Vandermast's ghost of Hercules attempted to pluck the fruit of the tree, but Bacon commanded the devil responsible for the impersonation of Hercules to transport the German to his own country, which done, the friar refused any monetary reward from the king for his services.

The wisdom of the friar is reported in the eighth episode, wherein he is said to have saved the endangered lives of three brethren, sons of a gentleman who had bequeathed his land and goods to the one who loved him most. This bequest led to a combat, which was prevented by the friar, who caused the father's dead body to be set up, so that the sons might direct their arrows in a contest as to which could enter nearest the heart. Only the youngest son refused to perpetrate so atrocious an act, and to him, as the most loving, was awarded the estate.

The ninth tale shows how Friar Bacon presented three thieves with the sum of one hundred pounds, but afterwards caused them to be led such a dance across country by the piping of his man Miles, that they abandoned their sacks of money which were restored to their owner.

The tenth anecdote records how Vandermast sent a Walloon soldier to murder Friar Bacon in his room, but the man was so terrified when the friar raised up before his eyes the ghost of the Roman Emperor, Julian the Apostate, in fiery torments, that he repented and sought a better course of life.

The story ends with the dismissal of the man by the friar to the Crusades, where he was slain.

Then follows, in account number eleven of these marvelous doings, the report that Bacon gained the mastery over an old usurer by employing the funds he had himself borrowed at interest, to benefit the poor, thereafter explaining to the irate usurer that he, the friar, had only done what the man himself had neglected to do.

Tale twelve relates to Bacon's man Miles, rather than to the friar himself, and may be read in the *Prose Romances*.

The part played by Friar Bacon in marrying a young man to the lady of his heart, is associated in the next and thirteenth "historic" with the confounding of Friar Bungay, the lady's father and the suitor to whom she felt so strong an objection.

In the fourteenth tale, Vandermast reappears and enters upon a trial of strength with Friar Bungay, devils representing Achilles and Hector being raised for combat. Finally, a terrific thunderstorm arises, the subsidence of which witnesses both the conjurers lying dead.

Tale fifteen concerns Miles, but the sixteenth narrative returns us to Friar Bacon and his Perspective Glass, in which two gentlemen behold their respective fathers in deadly duel. The spectacle so enrages the youths that they themselves fall upon one another with fatal result. The deaths of these unfortunate persons so moves the friar that, in an agony of remorse, he breaks the wonderful glass, and retires in shame to his cell.

Here, in story seventeen, he, in repentance, devotes himself to religion, and as a proof of his reformation burns his books containing "the greatest learnings in the world".

In his preface, Thoms refers to the tradition that Bacon obtained his skill by promising himself to the devil, after his death, on condition that he should die inside or outside the church; to avoid which fulfilment "caused he to be made in the church wall a cell" within which he awaited for death for two years.

The "Famous Historie" ends with the friar thus enwalled, receiving food and drink and uttering his discourses from a window. "Thus was the Life and Death of that famous Fryer, who lived most of his life a Magician, and dyed a true Penitent Sinner, and an Anchorite."

An old English play by Robert Greene¹ with the title of *The Honourable History of Friar Bacon and Friar Bungay* is to be found in *Old English Drama*, edited by Adolphus William Ward, Litt.D. (Fourth edition, Oxford, Clarendon Press, 1921. Impression of 1927. First edition 1879.)

In this drama we are introduced to the friar in his cell at Brasenose where he is reported to be

"read in magic's mystery;
In pyromancy, to divine by flames:
To tell, by hydromancy, ebbs and tides;
By aeromancy to discover doubts;
To plain out questions, as Apollo did."

Act I, ii, 14-18.

He is "making a brazen head by art" with the intention
"To compass England with a wall of brass."

Lines 23-30.

To his cell comes Prince Edward who sees in the wonderful glass a vision of "a lover and his lass" about to be wedded by Friar Bungay who is struck dumb by Bacon's art and is carried away by a devil. (Scene vi.)

Scene ix enacts the contest between Bungay and Vandermast at Oxford before the King, Henry III, the Emperor, Frederick II, the King of Castile and Elinor, his daughter; and it is then that Bacon, entering, transports Vandermast safely to his study in Hapsburg.

¹ ROBERT GREENE [1560-1592]. In a footnote Stevenson shows that "Margaret" (to whom he had made reference) "was the widow of John de Lacy, Earl of Lincoln, who died on the 22nd June, 1240". John and Margaret are the lovers in Greene's play—*Friar Bacon and Friar Bungay*. (*Op. cit.*, 230.)

In Scene xi, the story of the Brazen Head is dramatically shown, Miles being banished by the angry friar from his services.

Scene xiii depicts the cell visited by the two scholars, who, seeing their fathers in mortal combat, stab one another and fall dead to the consternation of both friars. Bacon speaks:

“I tell thee, Bungay, it repents me sore
That ever Bacon meddled in this art . . .
Bungay, I'll spend the remnant of my life
In pure devotion, praying to my God
That He would save what Bacon vainly lost.”

In his introduction, Dr. Ward points out that wherever theology and scholastic philosophy were studied, the suspicion of magic, or rather sorcery, prevailed.¹

Dr. Ward indicates also that this customary suspicion was Bacon's reward for attempting to “give a freer and wider range of culture to the University of Oxford”.

This attempt has been considered a failure as far as his own generation was concerned. Ward's comment regarding Brasenose is enlightening, since the College was not in existence in Bacon's time; he may have resided at one of the halls, while the College itself may have subsequently derived its name from the legend of Bacon's Brazen Head, a nose of brass being placed over the gate.

Concerning the Prospective Glass, Ward states that it appeared to represent in popular opinion a combination of the telescope, burning-glass and *camera obscura*. He declares that in Bacon's *Opus majus* the philosopher observed that “a variety of apparitions” result from “artificial condensation of the air and arrangement of several mirrors”, and in a footnote, that such a magic mirror was made by the enchanter

¹ As shown at a later date by Paracelsus [1490-1541], magic is essentially wisdom, knowledge of the secrets of nature as revealed by God through man's intuition, and as a result of his search for truth. Witchcraft, sorcery and necromancy, on the other hand, are essentially evil.

Virgil to enable the Romans to see to a distance of thirty miles, and also by Pope Gregory VII.

Ward attributes to Bacon the statement that Caesar employed great mirrors in Gaul to ascertain the position of the (supposed) enemy.

In his notes on Greene's play *Friar Bacon and Friar Bungay*, Ward states that the King's Hall and College of Brasenose was founded in 1509, but that Brasen Nose Hall was very ancient and that in the thirteenth century it was known by the same name on account of a nose of brass fastened to the gate. (*Old English Drama*, 228.)

A similar note (p. 232) informs us that Professor Adamson suggests that in both Greek and medieval thought mathematics "almost always included astronomy, harmony and optics" which idea may have been derived from the writings of Aristotle.

A note explains that "prospective" is that which looks forward—whether into the future or the distance, or that which is hidden from the bodily eye. (*Op. cit.*, 247.)

VII Some ^{*}Aspects of the *Opus Majus*

There is no book quite like the "Opus majus" in the Middle Ages, nor has there been one quite like it since. . . . It will therefore always remain one of the most remarkable books of the thirteenth century.

Lynn Thorndike, *A History of Magic and of Experimental Science*, Vol. II.

JOHN HENRY BRIDGES, M.B., F.R.C.P. produced in 1897 an edition of the *Opus majus*, published at Oxford by the Clarendon Press.

A volume which appeared in 1914 was entitled *The Life and Work of Roger Bacon*, with the sub-title of *An Introduction to the Opus majus*, with notes supplied by H. Gordon Jones, F.I.C., F.C.S.; the book being published in London by Williams and Norgate.

In the preface Mr. Jones informs us that Dr. Bridges launched this new edition to mark the six-hundredth anniversary of a man whom he considered "one of the earliest and . . . the greatest of Oxford thinkers".

Mr. Jones also points out that the new Oxford edition differed from the earlier one of Samuel Jebb, which appeared in 1733, in that it included the seventh part of the *Opus majus*, on the subject of Moral Philosophy.

Dr. Bridges suggests that when Bacon sent his three works to Pope Clement IV—"a busy statesman"—his idea was to persuade Clement to undertake a thorough-going reform of the Church, so that it might become a comprehensive, spiritual organization in the world at that time.

This suggestion he bases upon Bacon's use of the word *persuasio* to describe the *Opus majus*.

Moral philosophy was to Bacon the partner of theology, for, as he had explained earlier, he conceived Greek philosophy to be as much a development of the human mind and spirit as the message of Hebrew prophets, both being equally divinely inspired.

This view, combined with the importance which Bacon attributed to Arabian philosophy, was too latitudinarian for the acceptance of his generation. Nevertheless, it was based on actual experience.

Two members of the Franciscan Order—Carpini,¹ an early follower of St. Francis, who was sent from Lyons to the

¹ JOANNES DE PLANO CARPINI [1182–1252]. See the *Encyclopædia Britannica*, eleventh edition, Vol. V, for a full account of the first explorer of Southern Russia and Central Asia, who had been a companion and a follower of St. Francis of Assisi. Joannes was between 60 and 65 years of age when he started from Lyons in 1245, at the request of Pope Innocent IV, on a mission to the Mongols, from whom an invasion of Europe was feared.

At first his companion was Stephen of Bohemia, who was unable to continue the journey after reaching Kiev, so another friar—a Pole, by name Benedict—accompanied Joannes across the Dnieper, the Don and the Volga, till they arrived at the headquarters of the chief Tartar authority, Batu, who bade them continue their travels till they should reach the court of the Khan himself.

On Easter Day, 1246—a year after they had set forth—though excessively weak and ill, they started on a 5,000 mile ride across the Kirghiz steppes and Eastern Turkestan to Karakorum, which they reached in 106 days. Here they found a great multitude assembled for the election of the Khan's eldest son, Kuyuk, who was enthroned on 24 August, after which he dismissed the friars with a missive to the Pope. It is said that this document in Mongol, Latin and Arabic claimed the right of the Tartar Khan to please himself in the matter of invasion.

Almost another year elapsed before the weary travellers once more appeared in Lyons. Joannes recorded his findings regarding the Tartars in a wonderful descriptive narrative entitled *Historia Mongolorum quos nos Tartaros appellamus* and in a second with the title of *Liber Tartorum*. Subsequently, Carpini was appointed Archbishop of Antivari in Dalmatia.

Ruler of the Tartars in Siberia, and Rubruck¹ (or Rubruquis) who left Flanders at the request of Louis IX to go to Central Asia, brought back reports which made a "deep impression" upon Bacon who alludes to them in the *Opus majus*.

We are told by Dr. Bridges that Roger actually contacted Rubruck when he visited Paris, and heard from him an account of the great Congress of Faiths—Christian, Moham-
medan and Buddhist—which had taken place at Karakorum at the invitation of the Tartar Khan, who presided over the gathering.

Roger Bacon in his *Opus majus* quotes Rubruck, whom he describes as "Brother William whom the King of France sent to the Tartars, Anno Domini 1253 who travelled eastern regions and districts adjoining them, and he wrote the afore-said [descriptions] of the illustrious king, the Great Khan, which book I studied diligently and with their author have conferred". (Oxford edition, 1897, 353-6.) See also Appendix IV and Bibliography.

¹ WILLIAM OF RUBRUCK [1215-1270], was another Franciscan friar who was also a traveller-missionary. The eleventh edition of the *Encyclopædia Britannica* states that we know of him only from his own writings and from those of Roger Bacon. It is thought, but without certainty, that William was a native of a village in French Flanders.

As early as 1248 Louis IX had sent a return mission to the Mongol Khan, and his envoys had brought back with them an insolent letter from the Regent-Mother in 1252.

Hearing that Sartak, the son of Batu, had been baptized as a Christian, the French King decided to try again. This time his messenger was Friar William, who, preaching in the church of St. Sophia in Constantinople, on Palm Sunday, 1253, explained that he would not go as a formal ambassador.

Rubruck landed with others in the Crimea whence they travelled across the Don and Volga and across the steppes. As before, in the case of Carpini, Batu sent on the travellers to the Khan himself, a journey which has been estimated at 5,000 miles. The dates of arrival at, and departure from, various halting-places are known and Karakorum was not reached till 27 December 1253, where the mission appears to have stayed till 10 July 1254.

Like Carpini, William wrote an account of his journey depicting the character of the country, rivers, lakes, etc., and the manners and customs of the peoples of Central Asia.

Hearing at first hand of this Congress, Bacon's conclusion was that, of the three great religions proclaiming the existence of One God, the Christian Faith was superior to that of either the Jews or the Moslems. Consequently he felt that it was the rôle of the Catholic Church to seek to gather into one fold men of divers beliefs and traditions.

Another valuable lesson to be learnt, according to Dr. Bridges, from the *Opus majus* is that, in Bacon's own words "all the sciences are connected". All have their separate uses, but the highest use of all is to serve mankind.

In the same way, systems, however different, may be regarded as having a unity of aim, that aim being to promote human progress. Examples of such systems quoted by Dr. Bridges are "Roman law, Greek thought and Hebrew theocracy".

Dr. Bridges regards the views of Bacon on moral philosophy as the "keystone" of the whole work, inasmuch as it treats of "life and conduct".

Throughout the volume, mention is constantly made of a projected work called *Scriptum principale*, of which the *Compendium studii philosophiae* may have been intended as an introduction. The *Scriptum* appears never to have been completed, since Bacon's diatribes against existing institutions, based on his own inner vision of the urgent need for a reformed Church, led to his imprisonment and the enforced end of his zealous admonitions.

An interesting reference to Bacon is to be found on page 37, describing how Dr. John Dee addressed a Petition to Queen Elizabeth in 1582, on the subject of the Calendar¹ and the need for its emendation. We are told that "None hath done

¹ The Calendar, drawn up by Julius Caesar with the assistance of the astronomer Sosigenes, was a solar one, consisting of $365\frac{1}{4}$ days. The months beginning with January were to consist of alternately 31 and 30 days except February which had usually 29 and in leap years 30 days. Caesar renamed the month Quintillis, July after himself. Two extra months were inserted between November and December. The year was some 12 minutes too long, but the error was not corrected till the time of Gregory XIII.

it more earnestly, neither with better reason and skill, than hath 'a certain' David Dee of Radik" who turns out to be none other than Friar Roger. A footnote informs us that this Petition is preserved at Oxford among the Bryan Twyne MSS. at Corpus Christi College.

Dr. Bridges enables us to realize with what joy Bacon turned from the ponderous arguments of the schoolmen to the new vista of truth to be unfolded before the mind's eye of the ordinary seeker in his converse with his fellow men, and in the daily lessons to be learned from the experiences of life itself.

The following important passage is quoted on page 25 from page 23 of the first volume of the *Opus majus*. "The wiser men are the more humbly will they submit to learn from others. . . . I have learned more important truths beyond comparison from men of humble station . . . than from all the famous doctors."

Treating of the discussions of the scholastics, Dr. Bridges believes that Bacon's ideal was to dissuade men from indulging in "verbal subtleties", and to direct them to the realities of the everyday world.

It must, of course, be remembered that the words used in the thirteenth century had not precisely the same meaning that they have to-day; thus, what Bacon called "*scientia de ponderibus*", Dr. Bridges terms Barology, while Agriculture had a far wider interpretation than the derivation of the word would lead us to suppose.

Dr. Bridges thinks that in persuading men to make themselves conversant with languages Bacon's hope was two-fold; that a better translation of the Scriptures might be forthcoming, together with a more correct rendering of the works of Aristotle. He informs us that Bacon's account of biblical texts may be found in the *Opus minus*, pp. 334-49. He quotes Professor Brewer, page lxii, as saying that Bacon's endeavours in this direction have not received sufficient recognition, and laments that Oxford was neither ready nor willing to accept Bacon's ruling as to the need for such studies as Hebrew and Arabic.

Turning to the upholding by Roger Bacon of the Law of the Church (Canon Law), Dr. Bridges refers to the studies of Roman and Civil Law which were taking place at Bologna, and he quotes Bacon as exclaiming in the twenty-fourth chapter of *Opus tertium*, "Oh that the canon law might be purged from the superfluities of civil law, and be ordered by theology; then would the government of the Church be carried on honourably and suitably to its high position." A dream, but a hopeless one, doomed to disappointment.

There is a passage in the thirteenth chapter of the *Opus tertium* wherein Bacon describes his instructor, Peter, as "a master of experiment".

"He is ashamed that any things should be known to laymen, old women . . . ploughmen of which he is ignorant. Therefore, he has looked closely into the doings of those who work in metals and minerals of all kinds . . . he has looked closely into agriculture, mensuration, and farming work; he has even taken note of the remedies, lot-casting and charms used by old women and wizards, and magicians and of the deceptions and devices of conjurers. . . . As for reward, he neither receives or asks it."

In a footnote Mr. H. Gordon Jones asserts that Bacon found the old Julian Calendar erroneous, since it added to the length of the year $1/130$ of a day, which worked out by the thirteenth century at ten days too many.

VIII Why Roger Bacon became a Franciscan - A Suggestion

JOHN RICHARD GREEN in his *A Short History of the English People* reminds us that "the life of Roger Bacon almost covers the thirteenth century", and that Oxford, when Bacon studied there, "stood in the first rank among English towns".

At Oxford, Edmund of Abingdon¹ introduced him to the works of Aristotle. Green reminds us also that the spirit of inquiry which the University of Oxford tended to foster, was a direct threat to the Church, with the result that the endeavour to establish scientific knowledge had to contend with much opposition and many serious obstacles. Green quotes (without stating the source) a long passage from Roger Bacon explaining the difficulties which he met with as a seeker after truth, in any save the accepted channels of information. It runs as follows:

"Slowly has any portion of the philosophy of Aristotle come into use among the Latins. His Natural Philosophy and his Metaphysics with the commentaries of Averroes and others were translated in my time, and interdicted at Paris up to the year A.D. 1237, because of their assertion of the eternity of time and of the world, and because of the book of divinations by dreams (which is the third book *De somniis et vigiliis*),² and because of many passages erroneously translated. Even his logic was slowly received and lectured on. For S. Edmund,

¹ EDMUND RICH, born at Abingdon.

² A work of Aristotle dealing with the theory of knowledge and of scientific method.

the Archbishop of Canterbury, was the first in my time who read the Elements at Oxford. And I have seen Master Hugo, who first read the book of Posterior Analytics, and I have seen his writing. So there were but few considering the multitude of the Latins, who were of any account in the philosophy of Aristotle; nay, very few indeed and scarcely any up to this year of grace 1292" (p. 129).

Green maintains that "the fortunes of the University were obscured by the glories of Paris", to which place Bacon resorted for the completion of his studies. Green's opinion is that, whereas Feudalism tended to isolate men and groups of men, so the university, and particularly that of Paris, was, as it were, a protest against this isolation. He shows too, how all nations were represented in the Paris schools, where they could speak a common language (Latin) and enjoy the intercourse of mind with mind in a common learning which transcended local, provincial and national differences and squabbles.

We are told by Green that Bacon expended what wealth he had in "costly studies and experiments". The historian of the English people quotes Roger (once again without stating the source of his quotation) as follows: "From my youth up, I have laboured at the sciences and tongues, I have sought the friendship of all men among the Latins who had any reputation for knowledge. I have caused youths to be instructed in languages, geometry, arithmetic, the construction of tables and instruments, and many needful things besides" (p. 129).

But these "needful things" cost money. "Without mathematical instruments no science can be mastered", cried Roger despairingly, "and these instruments are not to be found among the Latins, and could not be made for two or three hundred pounds. Besides, better tables are indispensably necessary, tables on which the motions of the heavens are certified from the beginning to the end of the

world without daily labour, but these tables are worth a king's ransom, and could not be made without a vast expense. I have often attempted the composition of such tables, but could not finish them through failure of means and the folly of those whom I had to employ" (p. 129).

This was not the only source of complaint.

"The philosophical works of Aristotle, of Avicenna, of Seneca, of Cicero and other ancients cannot be had without great costs; their principal works have not been translated into Latin, and copies of others are not to be found anywhere, so far as I can hear, though I have made anxious enquiry for them in different parts of the world, and by various messengers. I could never find the works of Seneca, though I made diligent search for them during twenty years and more. And so it is with many more most useful books connected with the sciences or morals" (pp. 129-30).

Poor Bacon! We can perceive his great mind ranging afar, while his purse was empty. No wonder he rejoiced in pouring out the riches of his intellect upon such fertile ground as the eager mind of his young disciple. Writing to the Pope concerning the fifteen-year-old John, he claims that:

"I have caused him to be nurtured and instructed for the love of God, especially since for aptitude and innocence I have never found so towardly a youth. Five or six years ago I caused him to be taught in languages, mathematics and optics, and I have gratuitously instructed him with my own lips since the time that I received your mandate. There is no one at Paris who knows so much of the root of philosophy, though he has not produced the branches, flowers, and fruit because of his youth and because he has had no experience in teaching. But he has the means of surpassing all the Latins if he lives to grow old, and goes on as he has begun" (p. 130).

One wonders at the silence of history regarding this promising student, and whether Bacon's discriminating prediction was fulfilled.

Of optics Bacon stated that "The science . . . has not hitherto been lectured on at Paris or elsewhere among the Latins, save twice at Oxford" (p. 130).

Green asserts that the thirteenth century did not want Bacon's science, with the result that at the end of forty years the philosopher found himself, as he himself admitted, "unheard, forgotten, buried" (p. 130).

Bridges suggests that the two thousand pounds which Bacon spent on books and instruments were French pounds, and therefore represented a considerable sum. When they were gone, no further source of income remained.

Green seems to hint that Bacon, "ruined and baffled", followed the advice of Grosseteste in entering the Franciscan Order, wherein poverty was the Rule and "books and tables" were frowned upon as hindrances to its acknowledged work of ministry to the lepers, the poor, the sick and all those in need of the preaching of the Gospel.

Whether this surmise as to Roger's strange act in becoming a Franciscan be correct or not, it could not curb his mental activity, as proved by the production in a year—1267—"the *Annus Mirabilis* in English science"—of the *Opus majus*.

Green, quoting Dr. Whewell,¹ explains the object of this work as having been "to urge the necessity of a reform in the modes of philosophizing, to set forth the reasons why knowledge had not made a greater progress, to draw back attention to sources of knowledge which had been unwisely neglected, to discover other sources which were yet wholly unknown,

¹ WILLIAM WHEWELL, D.D., the son of a carpenter, was born at Lancaster in 1794, and had a successful career at Trinity College, Cambridge, of which he became Master. He became a Fellow of the Royal Society, holding Professorships of Mineralogy and Moral Theology. Among the subjects of his writings were the tides, electricity, magnetism, and the history of moral philosophy in England. He died in 1866.

and to animate men to the undertaking by a prospect of the vast advantages which it offered" (p. 131).

Green would have us believe that mathematics comprised all the physical science of the time. He quotes Bacon as declaring: "The neglect of it for nearly thirty or forty years hath nearly destroyed the entire studies of Latin Christendom. For he who knows not mathematics cannot know any other sciences; and what is more, he cannot discover his own ignorance or find its proper remedies" (p. 132).

Green gives as one of his main sources the writings of Matthew Paris (Rolls Series) but, in treating of Roger Bacon, his final citation is again from Dr. Whewell, who considered the *Opus majus* "at once the Encyclopaedia and the Novum Organum of the thirteenth century" (p. 132).

IX Student and Interpreter of the Scriptures

WE are indebted to Beryl Smalley, of Girton College, Cambridge, for a work entitled *The Study of the Bible in the Middle Ages*, published in 1941 by the Clarendon Press, Oxford.

This book discusses the history of scholarship as applied to the study of the Bible, from the time of the early Fathers to the period of scholasticism as expounded by the friars. It deals with the subjects of logic and its branches—dialectics or the rules and modes of reasoning, rhetoric or the theory and language of eloquent speech, and grammar, in the sense of the right use of language—of those studies in fact which so greatly exercised the mind of Roger Bacon.

The author shows how these sciences and liberal arts are necessary, in so far as they contribute to an understanding of Scripture, the knowledge of which requires such aids as the mastery of tongues, grammar and history.

We are informed that original written exegesis (the interpretation of the Scriptures) “began again during the middle of the eleventh century”, which gave rise to the textbook movement; that is, the provision of a commentary or *gloss*, used in the study of the Bible and also of Roman and Canon Law. The result appears in the production of the *Gloss ordinaria*.

This leads to a chapter devoted to the Victorines—the monks and scholars of the Abbey of St. Victor at Paris, founded in 1110. Of these the two most famous were Hugh and his pupil Andrew.

A text or scriptural passage might be interpreted literally,

allegorically, metaphorically, or mystically and morally, and it seems that Andrew of St. Victor accepted the literal interpretation.

In this connection Smalley points out that a commentary may be produced in the cloister, while a gloss, providing notes on the text and information regarding the standard works upon it, came from the classroom and was intended to assist the student when he left the lecture hall.

As a commentator or glossator, Andrew maintained that his writings were undertaken for his own satisfaction, as an aid to memory and as a work which he enjoyed. His teaching is given in a quotation, part of which runs as follows: "Righteousness is its own reward, and what more righteous for a rational creature than to investigate the truth? We think so."

He goes on to write of "the toilsome search for wisdom . . . this pleasant toil, this toilsome pleasure".

Soon after we are told that "you cannot do what you will, if you will not do what you can. He is not altogether useless who is useful to himself."

Still later he explains that "No one is obliged to take my gift. I keep watch for myself, I work for myself."

Smalley shows how as Jerome "had followed the Greeks, so Andrew will follow Jerome". She shows, further, how the exegete himself stated his sources. Andrew claimed that he had used commentaries and glosses, and that his instructors "had been Jews and others". The names of these Jewish teachers are given, but it is also mentioned that the Jewish communities of Northern France may have been in personal contact with the Christian scholars, so that Andrew knew them as well as their works. He studied the Hebrew text and accepted as literal the Jewish explanation.

As at least fourteen of Andrew's manuscripts are extant, Roger Bacon, whom Smalley terms "the most popular of English thirteenth-century scholars", was enabled to read them, and we know that he did so. In his *Compendium studii philosophiae* he complains of the authority "ascribed

to a certain Andrew" who expounds the Bible *ad literam*. Nevertheless, he praises the said Andrew for the following reasons: "He stirs us up about the doubtful passages of our translation, in many cases, though not always, and sends us to the Hebrew that we may seek our explanations more surely at the root. Few would take thought for the true explanation of this passage and many others, unless they had seen how Andrew treats it" (viii Ed. Brewer Rolls Series, 482-3).

Smalley, who regarded Bacon as "a rebellious reactionary or a reactionary rebel", states that his objections to the scholastic method are expressed in a passage of the *Opus minus* (p. 323), in which he condemns the arbitrary custom of introducing "concordances or rhythms" from commentaries on the philosophers, grammarians and law-books.

Smalley believes that Bacon's thinking was "conservative". She quotes a passage approving another monk of St. Victor, Richard, who wrote regarding the Tabernacle and the Temple. Bacon emphasizes the necessity of geometry "in order that the Noe's ark, the tabernacle with all its furniture, the temple of Solomon and Ezechiel may be described physically . . . otherwise it is not possible for the literal sense to be known, nor in consequence the spiritual. The holy and wise men of old strove after this. I have seen some of their work, and this is how Scripture represents things, that we may know old and new, and see with our eyes the cult of that people which prefigures the new." (*Opus tertium*, 203.)

From her studies of Roger Bacon's works, Smalley is of the opinion that Bacon, like SS. Jerome and Augustine, urged that Scripture be read in the original. Hence he urged also the necessity for knowledge of Hebrew and Chaldean for the study of the Old Testament, and the Greek Fathers for that of the New. She summarizes Bacon's war-cry as *Veritas in radice*—Truth is in the source.

Taking this as his slogan, it was essential for the student to start with the Latin Vulgate. But what of the original? Bacon prayed the Pope to appoint a commission of scholars

to revise the existing version of the Vulgate. He insisted that to understand the Vulgate one must have a knowledge of Jerome's vocabulary and background, and he would not accept glosses made later than the time of the early Fathers. Taking the word *lectus* from the gloss on Ezek. xxiii, 41, Bacon denied the accepted translation of 'bed', maintaining that it was the couch on which men of old time reclined when taking a meal.

It is made plain that Bacon contributed in three ways to the biblical scholarship of his day. Firstly, by pointing out and listing mistakes in the accepted texts. Secondly, by formulating rules for the study of original texts. Thirdly, by composing Greek and Hebrew grammars. Smalley suggests that his idea of composing a Greek grammar was his own, but she goes on to make the unusual suggestion that "he administered his grammar by magic arts". This remarkable notion appears to have been based upon Bacon's alleged statement that he could initiate a would-be learner into the Hebrew or Greek tongues so that after three days the initiate could read those languages!¹ She claims to guess at his method, but does not reveal it, merely referring her readers to a forthcoming article to be issued in the Journal of the Warburg Institute by herself and E. Jaffé.²

Though denying that Bacon was, strictly speaking, a biblical scholar, Smalley attributes to him disapproval of the *Correctoria* or lists of corrections introduced by the Dominicans, and approval of the use of the ancient Latin, as well as Greek and Hebrew manuscripts. We are told that Bacon's

¹ *Thorndike, op. cit.*, suggests that Bacon's boast was less extravagant than it seems. He thinks Bacon did not know "a vast amount" of Greek, Hebrew and geometry. He further quotes from Professor D. E. Smith's translation of Bacon's *Communia mathematica*, in which the complaint is made of the "thirty or forty years" spent by teachers of mathematics who seek to demonstrate it and continue "multiplying conclusions" so that "there are so few students of a science which is a prerequisite to all knowledge".

² Not yet published (13th August 1953). To be published by the Warburg Institute in *Mediæval and Renaissance Studies*.

friend William de la Mare, a Franciscan teaching in Paris about 1260, also produced a *Correctorium*, which stated that the Vulgate version of a text must not be altered when its meaning was not the same as the Hebrew.

Another Franciscan mentioned by Smalley was Thomas Docking, a pupil of Roger Bacon, who spoke in his lectures of the "subtle, noble, literal sense".

X The Master Mind

The mind of Roger Bacon was strangely compounded of almost prophetic gleams of the future course of science, and the best principles of the inductive philosophy.

Henry Hallam, *Literature of the Middle Ages*, Vol.I.

IN 1928 A. G. Little, D.Litt. delivered the Henrietta Hertz Trust of the British Academy Annual Lecture on a Master Mind, choosing for his subject Roger Bacon.

This was published in pamphlet form by Humphrey Milford, Amen House, London, E.C., being Vol. XIV of the *Proceedings of the British Academy*.

On 4 July 1928 A. G. Little, a Fellow of the British Academy, put forward the view that the writings of Bacon had been studied continuously since his death, and that they are still being studied.

He also stated that as early as 1385 occurred the earliest reference to the legends associated with "Friar Roger called Bachon". The writer was the physician Peter of Trou, in Dalmatia, who mentioned such wonders as a bridge passing through the air, and the two Oxford mirrors, by one of which candles might be lighted at any hour, and by the second of which one might perceive the doings of others in any part of the world.

In an age of learning Bacon was considered "most learned in all subjects". Little suggests that until the year 1247 the philosopher was pursuing ordinary studies, but that, after this date, he left the "beaten track" and "laboured specially in the study of wisdom", according to his own plan. Among his early work may have been the treatise on *Old Age*

which was undertaken at the instigation of Philip de Grève, Chancellor of Paris, who died in 1236.

A manuscript in the library of Amiens (MS. 406) contained a number of *Quaestiones* on Aristotle.

Little maintains that during the second period Bacon forsook argument for "experience", and he quotes from Bacon's letter to the Pope regarding the burning glass made by a Paris craftsman during a number of years, which revealed "the beautiful power of wisdom".

It is also stressed that Bacon asserted that by means of the knowledge of created things we attain a knowledge of the Creator. Here is Bacon's motive for inquiring into natural things. We are told that in the *Opus majus* (iii, 80, 119-25) he inveighed vehemently against the folly of Crusades, advocating in their place the method of "simple preaching" to the heathen, as practised in the early Church.

His knowledge of geography appears likewise to have been based on "experience", for he claimed to have perused his book diligently and conferred with the author (William de Rubruck) and with many others who have investigated the geography of the East and South. (*Opus majus*, i, 305; cf. 303, 356-74, 400.)

Feeling the need for a map of the known world, Roger constructed such a map, with the chief towns shown in red circles on the parchment, and the latitude and longitude of each roughly estimated. (Brewer, *Computus studii*, 429-30.) Whilst he alludes to the discovery by Monsignor Pelzer in the Vatican Library of missing parts of the *Opus minus*, and a portion of the *Opus majus* sent by Bacon to Clement IV, Little states that Bacon's map has not yet come to light.

In the lecture a passage from the *Opus majus* (iii, 68) which may be regarded as Bacon's confession of faith was mentioned: "There is one perfect wisdom which is contained in Holy Scriptures and has been given by God to the saints." In this connection Roger sought out whatever evidence there might be to substantiate the belief held generally in the thirteenth century that Anti-Christ was about to appear. As

part of this evidence the current idea of an imminent invasion of Europe by the Tartars "through the midst of the gates, far away among the mountains where they were enclosed" appears to have been accepted by him.

Bacon believed, according to Little, that Anti-Christ would employ all kinds of forces derived from the processes of nature and art to confound the world. Hence arose Bacon's idea that these occult forces, instead of being ostracized by Church and State, on account of possible evil consequences, should be investigated by the Church, in order that, directed by the Pope, the Church might meet Anti-Christ and overthrow the evil power by his own occult weapons. (*Opus majus*, 221 and *Opus tertium*, 17, 18, 54.)

It was Roger's belief also that the evil powers would employ, not magic forces only, but man-made inventions. Contrary to the opinion of other scholars, Little attributes to Bacon the conception of marvellous machines, such as the "flying machine and a navigating machine", as well as a mechanical car, answering in its description to a present day tank. Bacon claimed that such contraptions had been made in his own, as well as in former times, so that he could "speak with certainty of them". (*Opus tertium*, 19.)

When we remember that Bacon lived in an age which conceived the earth to be the centre of the universe, it is not to be wondered at that he shared the common belief in astrology,¹ or the influence of the stars upon human events. Little states that Roger found his fellow men failing to regulate their lives by the motions of the stars and he urged that because the subject was a complex one, no excuse existed for neglecting it.

¹ With regard to experience and experimental science Thorndike's view seems to be that Bacon, like Albertus Magnus and others, was not altogether consistent in writing about astrology and magic. In certain cases Bacon, like others, gave credit to alleged marvels: in other places condemnation was expressed for necromancy and magicians. An interesting point is that Bacon accepted the idea that valuable medical knowledge may be gathered by observing the remedies used by animals in cases of sickness or injury.

In his lecture on a "Master Mind" it is interesting to note Little's findings with regard to Bacon's own view on the mind. We are told that, like his fellow Franciscans, this "Master Mind" perceived the lack of true knowledge regarding the simplest natural object, and the contradictory opinions of those who claimed to know. Bacon's argument appears to have run thus: "No one knows truly and adequately the nature of the tiniest thing, such as a single blade of grass or a fly." It continued as follows: if mistakes abound concerning material things, how much more is this the case of spiritual things. Therefore true wisdom can only come through Divine revelation (*Opus majus*, ii, 384); that which Bacon termed *Intellectus agens*, which, inspiring the human mind, produces that oft-repeated word "experience". (*Opus majus*, ii, 170-1.)

In a final paragraph Little explains that Bacon fully realized the tremendous amount of fraud existing then (as now) among so-called magicians; but at the same time he was aware of the immense powers of occult forces, such as the spoken word under certain circumstances. He felt acutely that the world is full of things of which we have no knowledge, through lack of investigation. (*Opus majus*, ii, 218.) His summing-up of this subject regarding Bacon is that "he will not pack comfortably into a nut-shell . . . he had his feet firmly planted in medieval soil, and yet had a strikingly clear vision of far off future things".

XI On Medicine

FOR a study of Bacon's treatise on the Delaying of Age (*De retardatione accidentium senectutis*) we must turn to a volume in which this treatise is edited for the first time by A. G. Little and E. Withington (Oxford, Clarendon Press, 1928).

After a comparison in the first part of the introduction of the texts, by Mr. Little, Mr. Withington presents a second part comprising a short description of the characteristics of *De retardatione*, Roger's authorities, his system of medicine, and an exposition of the secret remedies specially advocated by the philosopher.

Withington considers the treatise on Old Age to be a "grievous disappointment", since it shows little originality on Bacon's part, and too much acceptance of current medical theories and practices.

Unlike Paracelsus, Bacon took for granted the teaching of the physician Galen, and he also pinned his faith to the medicine of Chaldea and Greece. Especially did he follow Arabian medicine. Bacon considered the greatest of Aristotle's works to be his *Secretum secretorum*.

Among the Arabian medical authorities, in addition to Avicenna, whom Bacon quoted 100 times, were Rhazes, Haly Regalis, and Haly super Tegni, Isaac, Ahmed, and Damascenus.

Roger Bacon accepted the doctrines of the thirteenth century with regard to the four humours—fire, air, earth and water, and the four natural qualities—cold, heat, moisture and dryness. He believed in the existence in the human body of blood, phlegm, and yellow and black bile, all of which were connected with the "four digestions".

Withington suggests that Bacon not only treated of current

medicine, but that he added thereto. This he did by naming certain substances for the prevention of old age, not hitherto openly disclosed. These secret remedies or *occulta* were seven in number. The first, found in the ground, was probably gold, which being precious and incorruptible, alchemically connected with the sun, was a recognized remedy from very early times.

The sea yields two *occulta*—ambergris and pearls, the former a mysterious product of the whale,¹ the second an ancient remedy advocated by Paracelsus.

Owing to their habit of sloughing their skins, vipers may have given rise to the idea that vipers' flesh has the power of rejuvenation and of healing. Vipers being common, the occult side of this remedy lay in the right kind of serpent, and in preparing the skin in the correct manner.

The fourth *occultum* is a far pleasanter one. It is the shrub, rosemary, which, in case of survival, lives for many years. Bacon mentions a "queen" who had benefited by its qualities, and this reference may have been later associated with the Queen of Hungary, whose youth was so restored by means of rosemary that when a widow of seventy-two years she received a proposal of marriage from the King of Poland.

The fifth *occultum* concerned the bodily heat generated by the young and healthy, whether of human beings or of animal fellow-creatures. Bacon was probably thinking of Galen's counsel for persons with "cold indigestions" who should resort to the remedy of receiving upon the region of the stomach "a plump child or a fat puppy". Withington affords the interesting information that Thomas Sydenham believed that the bodily heat from a healthy person is "balsamic" in nature.

It was believed that the hearts of certain large animals such as a stag became partly ossified, with the result that they were imbued with 'virtue', and as such might form an

¹ The writer has heard it stated in a scientific broadcast that the nature of ambergris remains a secret, unanalysed by twentieth-century science.

ingredient in the so-called elixir of long life. Such was the basis of the sixth *occultum*, taking the form of the bone of stag's heart.

Because the flesh of dragons has an outer coating of hard scales, it was supposed, when suitably prepared, to prevent the accidents of old age. This seventh *occultum* was also credited with increasing human wisdom.

Withington estimates that Bacon's best treatise is that one entitled the Errors of doctors (*De erroribus medicorum*), but he points out that the task of criticizing the medical profession is not a difficult one. We may, however, admit that Bacon, by pointing out that "no argument whatsoever can end in absolute knowledge of fact", has performed a service to his own century and all subsequent ones.

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Among the remedies from the plant kingdom known and used in the Complete Glossary of Drugs which follows the notes of the Latin version of Bacon's *De retardatione* are the following: aloes, anthos (rosemary), balsam (of Gilead and Engedi), basil, wild cabbage, calamint, camomile, wild carrot, cassia, celandine (greater), cinnamon, crocus (saffron), dittany, elder, fennel, fumitory, hellebore, hound's tongue, mace, marjoram, myrobalan, olea, penny-royal, pomegranates, radish and rhubarb.

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XII An Estimate of his Philosophy

A NUMBER of *Lectures on the Study of History* delivered at Owens College, Manchester, have been collected into one volume, published in 1854. (In London by Longman, Brown, Green and Longmans; and by Taylor, Walton and Maberly. In Cambridge by Macmillan & Sons; in Manchester by T. Sowles.)

It was published at the desire of the Trustees of Owens College "for its intrinsic value", and to complete for them the series of inaugural lectures by professors and teachers of that institution.

The last of these lectures is entitled "Roger Bacon, the Philosophy of Science in the Middle Ages". An introduction to the Sessions 1876-7, by Robert Adamson, M.A., Professor of Logic in Owens College. (Manchester, J. E. Cornish. London, Simpkins, Marshall & Co. 1876.)

In a prefatory note Adamson expresses his indebtedness to Charles's "extremely interesting work" which seems to have attracted "singularly little attention among English readers". Adamson adds that Charles "does not seem to me to have appreciated fully Bacon's attempted reform of scientific method, the most valuable part of his philosophy".

Adamson asserts that "the great Humboldt¹ does not hesitate to call Bacon 'the most astonishing phenomenon of the Middle Ages' ". He himself considers Bacon "this great, but much neglected thinker".

He shows that scholasticism consisted in refusing to discuss,

¹ FRIEDRICH HEINRICH ALEXANDER, BARON VON HUMBOLDT [1769-1859], naturalist, chemist, author of geographical works and *Cosmos* (1845-1862).

or esteem of interest or importance, anything "which had not on its side the weight of authority" . . . (p. 10). From its nature it was futile, and the *Doctor admirabilis* could not but reject it.

Adamson feels that if we examine the Arabian writers of the time, the contrast between Bacon and his more famous contemporaries will no longer astonish us (p. 13). The scientific enquiry of the former, their skill in mathematics, and their proclivities for practical invention appealed to the said *Doctor*. An example was the *Optica thesaurus* of Alhazen, which scarcely, if at all, was surpassed by Bacon in his *Perspective*.

Of one of his great contemporaries (probably either Thomas or Albertus) Bacon wrote: "He is a man of infinite patience and has amassed great information, but his works have four faults. The first is boundless, puerile vanity; the second is ineffable falsity; the third is superfluity of bulk; and the fourth is ignorance of the most useful and most beautiful parts of philosophy" (p. 15).

Bacon called "the Angelic Doctor"—Thomas Aquinas—"vir erroneus et famosus" (a famous man but a blunderer). Bacon's fame, according to Adamson, rests on his attempted reformation of scientific method, and his work lay rather in theory than in practice. Thus Part I of the *Opus majus* consists in a setting forth of the causes, *offendicula*, as Bacon termed them, which have proved obstacles to philosophy among the Latin peoples. These were subjection to (1) authority; (2) custom; (3) popular opinion and the hiding of ignorance under the cloak of pretended knowledge.

This revolt against scholasticism, this plea for freedom of thought, led Bacon to declare that authority, though it attempts to compel belief, cannot enlighten the understanding. He also stated, "Whatever seems true to the many must necessarily be false", and that the argument of his day was "This is affirmed by our superiors; this is the customary opinion; this is the popular view; therefore it must be admitted".

Roger Bacon realized that the ordinary people are not guilty of the fourth fault, which is, as Adamson expresses it, "the peculiar property of the learned professors".

Part II is concerned with the relationship between theology and philosophy, "the end of all true philosophy" being, as Bacon maintained, "to arrive at a knowledge of the Creator through knowledge of the created world", of which assertion Adamson opines that: "A better definition has seldom been given". He explains that Bacon believed that all knowledge is revealed in the Scriptures, but that such knowledge is implied; hence the rôle of philosophy is to expound this implied revelation.

The third part lays the foundation of the new structure of real knowledge, which can only be obtained through Philology—a most comprehensive word, termed inadequately by Bacon "Grammar", which entails the study of Hebrew, Greek, Arabic and Chaldean. The study of original Greek must be followed by that of the Syriac versions, Arabic translations of the Syriac, and, finally, Latin versions of the Arabic.

Part IV deals with mathematics to assist theology and science, for to Bacon all natural philosophy is based on mathematics.

Regarding Part V, Adamson considers that in optics Bacon's knowledge did not go beyond that of the Arab, Alhazen, and that Part VI, dealing with science based on experience, is the most important. Argument cannot provide proof, which experience undoubtedly affords. This Bacon illustrated by the knowledge of fire, which must be based on practical experience. Thus, observation at first-hand is essential, and the function of such science is verification. (*Opus majus*, 448.) This he exemplified by the phenomenon of the rainbow.

In treating of Bacon's classification of the sciences in a natural or genetic order, Adamson suggests in a note that Bacon's ideas correspond with those of the Arabian philosopher, Alph-arabius.

XIII *In Memoriam*

ON the occasion of the seventh centenary of his birth a volume was issued by the Clarendon Press, Oxford, bearing the name of A. G. Little and entitled *Roger Bacon: Commemoration Essays*, consisting of fourteen appreciations by various writers.

In his introduction Little states that Bacon twice heard William of Auvergne lecture at Oxford on the subject of the *Intellectus agens*, and also that he heard John of Garlandia inveigh against those ignorant of etymology.

He also mentions that Bacon suffered a breakdown in health, since he wrote of being unable to take part in Oxford affairs, "owing to many infirmities". This was between 1256 and 1266.

Little also mentions "a glimpse" of Bacon engaged in hearing "a magical tale" at Paris.

Bacon was interested in international affairs, such as the Crusades of the French King, Louis IX, and the struggle between Frederick II and the Pope. He was aware of the brutalities of the Teutonic knights, and was not slow to recognize the difficulty which these caused to the friars who were endeavouring to convert the Slavs to Christianity. He greatly appreciated the preaching of the German Friar Berthold of Regensburg, declaring his "magnificent work" to be of more value than that of almost all the other friars.

Little refers to a letter brought by Sir William Bonacor from Bacon to Clement IV, which alas! is missing, and Bacon's extreme gratitude to Clement when the latter requested his work. Again Bacon mentioned his lack of health as one of his difficulties in carrying out the Pope's commission.

An interesting point is made by Little when he relates that

Cardinal Pierre d'Ailly in his *Imago mundi* quoted from the *Opus majus* (Book iv) a portion dealing with geography which was read by Christopher Columbus. The latter was so interested that he sent notes and quotations from it to the reigning monarchs Ferdinand and Isabella, and this may have been an incentive to Columbus to embark on his travels.

An essay by François Picavet, Secrétaire du Collège de France, treats of the place of Bacon among the philosophers of the thirteenth century, in which it is claimed that he has shown in a full, but always precise manner, what should be realized and pursued by himself, his contemporaries and their successors under the existing system of princes, kings and the Papacy.

Cardinal Gasquet deals with Bacon's attitude towards the Latin Vulgate and points out "how true and clear" were his findings on the subject of biblical revision.

The fifth essay is by S. A. Hirsch who makes it plain that Bacon implied the vast branch of learning known as Philology when he advocated the study of "Grammar".

Hirsch considers that Bacon hoped to produce works similar to his Greek Grammar for the Arabic, Hebrew and Chaldean languages, but he seems to have completed only "the elaborate treatise" for the study of Greek. In this connection he named seventeen authorities consulted by him, of whom the Venerable Bede was one of the greatest. It is the opinion of Hirsch that Bacon thought Hebrew to be the tongue in which God's revelation to humanity had been made, and he quotes from the *Opus majus* a passage to this effect: "God has revealed philosophy to his saints to whom he also gave the law. . . . It was delivered complete in all its details in the Hebrew language."

Concerning the arguments as to which was the earliest language, Hirsch inserts a note on the curious experiments initiated by the Emperor Frederick II. Babies, denied any intercourse through speech with foster-mothers or nurses, instead of demonstrating in later years what language they

would utter, died, apparently through lack of affectionate companionship and any mental stimulus.

David Eugene Smith treats of mathematics and of Bacon's place in the history of this science. He mentions Hermann,¹ of Germany, and Master Nicholas as two of the mathematical scholars of his day, but he states that Bacon held the mathematics of his century "in profound contempt". "When I questioned him about certain books of logic which he had to translate from the Arabic, he roundly told me that he knew nothing of logic, and therefore did not dare to translate them. . . . Nor did he understand Arabic as he confessed."

Thus, from Bacon's own words, do we gather how unsatisfactory was the professed scholarship of the time.

We are told that Bacon was termed at one time "the great mathematician" and that in one of his essays—the treatise dealing with old age—which was published in Latin at Oxford in 1590—he was termed "*doctissimus mathematicus*".

The tenth essay, by Pierre Duhem, Membre de l'Institut de France, in French, has the title "Roger Bacon et l'horreur du vide" explaining the philosopher's attitude towards the proposition that "Nature abhors a vacuum".

A writer on alchemy—M. M. Pattison Muir—contributed Essay XI on "Roger Bacon: His Relations to Alchemy and Chemistry". He explains that man's power to bring about changes in metals and minerals were sometimes so wonderful as to be considered due to the intervention of evil forces, which gave rise to the idea that behind these manifest transmutations there must be something of oneness and simplicity in nature itself. He quotes from Bacon's *Speculum alchimiae* as follows: "Alchemy is the art of science teaching how to make or generate a certain kind of medicine, which is called

¹ HERMANN, THE GERMAN. According to Thorndike, he was a translator of Aristotle and Averroes in the thirteenth century. He quotes Steinschneider (1905), pp. 32-5, as describing Hermannus Alemannus, or Teutonicus, as being a teacher of Roger Bacon in Toledo(?) about 1240-1260.

the Elixir, and which being projected upon metals or imperfect bodies, by thoroughly tingeing and fixing them, perfects them in the highest degree, even in the very moment of projection." (*Opus tertium*, xii, 14. Brewer's edition.) Thus Muir considers that practical alchemy consists in the preparation of this Elixir, sometimes called the Magistery. He states that Bacon called the Elixir "the Philosopher's Egge", and that he gave directions for producing it in his *Speculum alchimiae*. To him practical alchemy dealt with the purification of metals, not to be confused with speculative alchemy. He believed in the four elements of earth, water, fire, and air, and of the four conditions of dryness, wetness, hotness, and coldness, in the fundamental importance of mercury and sulphur, and in gold as the perfect metal, formed by quicksilver and sulphur in their purest forms and in their proper proportions. But Muir alleges that Bacon did not accept the idea of a universal primary matter.

Bacon placed alchemy fourth among the sciences, and was convinced of its importance as a branch of knowledge. Thus he was a predecessor of the modern exponents of chemistry.

Unlike most other biographers Lieut.-Colonel H. W. L. Hime, author of the twelfth essay, is of the opinion that Bacon discovered gunpowder, which others affirm was known before his time. He refers to a work entitled *Epistola de secretis operibus artis et naturae et de nullitate magiae* (about 1248) in which Bacon mentions "crackers" formed of saltpetre, charcoal, and sulphur.

Hime asserts that Bacon attacked magic and, since it was a dangerous pursuit, he went on to show that alchemists had to disguise their writings by means of codes. One of these methods consisted in the use of an anagram, which, when worked out, could form a recipe for an explosive mixture. Another method was that of abbreviations.¹

The discovery may have been accidental owing to an explosion in the course of an experiment, and possibly this occurrence gave rise to the story of the explosion of his Brazen

¹ See XIV *infra*.

Head, which "fell down, and . . . followed a terrible noyse with strange flashes of fire".

Essay XIII is on medicine by E. Withington, allusion to which has already been made (XI *supra*), while the last of the *Commemoration Essays* was contributed by Sir John Edwyn Sandys, who endeavoured to determine Roger Bacon's place in English literature. He concludes with the words of Mr. Robert Leslie Ellis, an editor of the other Bacon's works, who once said to Dr. Whewell after reading some of Roger's writings, "I am inclined to think that he may have been a greater man than our Francis".

Certain essays which have not yet been considered are four German appreciations contributed by the undermentioned authorities: Universitätsprofessor Dr. Ludwig Baur (Tübingen), *Der Einfluss des Robert Grosstete auf die wissenschaftliche Richtung des Roger Bacon*; Geheimer Hofrat Professor Dr. Eilhard Wiedemann (Erlangen), *Roger Bacon und seine Verdienste um die Optik*; Dr. Sebastian Vogl (Passau), *Roger Bacon's Lehre von der sinnlichen. Spezies und vom Sehvorgange*; Dr. J. Würschmidt (Erlangen), *Roger Bacon's Art des wissenschaftlichen Arbeitens, dargestellt nach seiner Schrift De Speculis*.

XIV The Cipher of Roger Bacon

THIS is the title of a work published in Philadelphia by the University of Pennsylvania Press and in London by Humphrey Milford, Oxford University Press in 1928. It consists of certain literary remains left by William Romaine Newbold, Professor of Intellectual and Moral Philosophy in the University of Pennsylvania, which literary efforts were edited with a foreword and notes by Roland Grubb Kent, Professor of Comparative Philology in the same university.

The latter has explained the title of the work and how it came to be written.

In 1912 a famous collector of manuscripts, by name Mr. Wilfrid M. Voynich, who was on a visit to Europe, purchased some ancient illuminated manuscripts, among which he found one, less beautiful than the rest and written throughout in cipher. It appeared to him to be the work of a natural philosopher of the thirteenth century, since it was illustrated by elaborate drawings, biological, astronomical and botanical. The only scholars whose names occurred to him as being capable of such work were Albertus Magnus and Roger Bacon.

This treasure was shown both in Paris and in London, but none came forward to decipher it, save only William Newbold, who claimed later to have discovered the key from certain Latin words upon the last page, which he rendered as *michi dabas multas portas*, interpreted as meaning, Thou to me gavest many doors, or gates. He also claimed, by means of a simplified alphabet, to have worked out some indecipherable letters intermixed with the Latin words, and these he resolved into the equivalent of the letters R.B. C O N I.

It was his opinion that the manuscript consisted of very minute characters, taken from a form of shorthand known to, and used by, the Greeks.

A reference which Newbold thought he had discovered was one to the riots in Oxford in 1273, when the serfs, leaving their masters, fled to the monasteries, near one of which was stationed the friar, Roger Bacon. It was stated that the friar abandoned his post to bring certain explosive materials from the city, with which to produce a scare, pretending that his mission was to fetch help for the wounded.

Other events of which the manuscript made mention were the comet of 1273, the annular eclipse of 1290, the allocation of the great nebula in Andromeda, the malady of Pope Clement IV, and the instructions for producing metallic copper.

It was the opinion of Newbold that Bacon was acquainted with the subject of ciphers as methods of concealing a record, and it was his suggestion that the work was undertaken during the philosopher's long years of confinement, and that its meaning was revealed to his disciple John. The latter may have been the recipient of the precious document, which at his death may have remained in the monastery with which John had been associated.

Newbold believed Bacon, whom he termed in an interesting outline of his life "The Forerunner of Modern Science", to have been the maker and possessor of lenses and mirrors, and also of a microscope and of a reflective telescope—the Perspective Glass. This would account, in Newbold's view, for the designs in the manuscript of supposedly biological processes and of astronomical diagrams.

Newbold worked from time to time at his task of deciphering the manuscript, and in April 1921 he lectured in Philadelphia to the members of the College of Physicians, and before the American Philosophical Society. The former lecture was printed in the *Transactions* (1921) of the College and R. G. Kent contributed a short description to *The Pennsylvania Gazette* of 27 May 1921.

From the printed lecture, from a history of the find contributed by Mr. Voynich to the same volume of *Transactions* and from manuscript and typed copies of Mr. Newbold's

notes, charts and papers, Kent has reconstructed the strange story of the cipher said to be the work of Roger Bacon.

Having acquired the volume Mr. Voynich observed that the cover bore on its front the date 1665 (or 1666), being the date of a letter from an individual named Joannes Marcus Marci to a person called Athanasius Kircher, presenting the manuscript to him. The writer has been identified with the Rector of Prague University, and the recipient of the gift as a learned Jesuit scholar who has given his name to the Kercherianum Museum in Rome.

The letter, having been translated, was found to contain a reference to Dr. Raphael who was a teacher of the Bohemian tongue at the court of Ferdinand III, and who stated that the manuscript had been a gift to the Emperor Rudolph, a great patron of the sciences of his time.

Upon its reception in America, the manuscript was found to bear upon the margin of its first page the autograph of Jacobus de Tepenez, honoured by Rudolph, whose name previously had been Horcicky, and whose signature may have been added about 1608. The suggestion to be found in *The Cipher of Roger Bacon* is that the manuscript came into the possession of Jacobus from the hands of the Elizabethan alchemist, Dr. John Dee.

Dee was an authority on Bacon and his works, and it is thought that he presented to libraries on the Continent manuscripts now retained in them. Dee was a friend of Thomas Allen who had been acquainted with the ninth Earl of Northumberland, and it is surmised that, during the rifling of monasteries by John Dudley, Duke of Northumberland, collections may have passed into his hands and, presumably, from him to Dee, the wandering necromancer, who may have made a present of the cipher manuscript to the Emperor Rudolph.

From the possession of Kircher it is possible that the cipher passed to one of the ruling families in Italy, remaining there with others till it was discovered by Mr. Voynich.

Such is the strange story revealed by the publication of

The Cipher of Roger Bacon,¹ to which all those interested in the subject must be referred for explanations of Mr. Newbold's methods. He claimed likewise to have deciphered the so-called Vatican Document and the letter from Bacon to Pope Clement IV, which was discovered by Professor Pierre Duhem in 1909. This purports to show that the Pope's malady was stone (in the bladder) for which Bacon tendered medical advice.

¹ *Thorndike, op. cit.*, 767, refers to the suggestion that Roger Bacon wrote in cipher, explaining that the idea is based on the supposition that secret knowledge can be thus imparted and also concealed. It may likewise have been resorted to in order to stress the importance of the matter written in cipher.

EPILOGUE

THESE pages were completed before the publication in 1952 of Dr. Stewart C. Easton's *Roger Bacon and His Search for a Universal Science* (Oxford, Basil Blackwell) which he has termed "A Reconsideration of the Life and Work of Roger Bacon in the Light of His Own Stated Purpose".

In his penultimate paragraph, the author explains that he has intended to place Roger Bacon, not so much in the framework of history as in that of his own time, and to consider him as a "person rather than as a phenomenon".

It appears to be Dr. Easton's view that, prior to sending his works to the Pope, Bacon was an unimportant figure in his century. The attention of the reader is called to conditions existing in the Franciscan Order, and to the effect upon the brethren of the prophecies of Joachim of Flora, a monk of Calabria, whose series of books was known as the "Everlasting Gospel" and who proclaimed three ages in the history of humanity. Another book which influenced the Franciscans was the *Introduction to the Eternal Gospel* of Brother Gerard of San Borgo, amplifying the prophecies of Joachim. Dr. Easton suggests that Roger Bacon may have accepted the teachings of these writers, and also the medieval belief that knowledge acquired by revelation was not an alternative to knowledge acquired through study and experience, but "an essential part of it".

Bacon, according to his latest biographer, had been greatly influenced by the work ascribed to Aristotle known as *Secret of secrets* which states that all sciences contain hidden knowledge, vouchsafed only to those able to receive it. Knowledge, for example, of the heavenly bodies had been granted to the sons of Seth, and was indeed *revealed* knowledge, or wisdom. Bacon's vision "most beautiful and magnificent" was that of a

universal knowledge, possible for a Christian, and capable of being fostered, instead of neglected, by the Church. Dr. Easton suggests that Roger deliberately joined the Franciscans from a desire for personal holiness, and to obtain those requirements necessary to one who would receive and promulgate this vision of a universal science.

The vision included the verification of knowledge through experience, the synthesis, that is, co-ordination of all branches and fields of scientific enquiry, which would interpret the specialized findings of experts in each field, and use them to the best possible advantage. Finally, these three "dignities" of science were to be unified in a whole termed by Bacon Moral Philosophy.

Dr. Easton accepts the rendering of "*scientia experimentalis*" as the science of experience, rather than of experiment, and he points out that the number of experiments which could be made is limitless, but that such experimentation would be worthless unless it could be interpreted and used.

In Appendix B the author expresses his opinion that the unnamed "Master" attacked by Bacon was Albertus Magnus, and in Appendix C Dr. Easton attributes to Bacon's authorship two fragments—*De sensu et sensato* and an unnoticed Treatise on Time and Motion. There is an impressive bibliography and index.

APPENDIX I

NOTES ON J. S. BREWER'S EDITION

IN accordance with the proposal made 26 January 1857 by the Master of the Rolls "for the publication of materials for the History of this Country from the Invasion of the Romans to the Reign of Henry VIII", J. S. Brewer, then Master of the Rolls, edited three works of Roger Bacon, namely the *Opus tertium*, *Opus minus* and *Compendium philosophiae*, and these were "published by the authority of the Lords Commissioners of His Majesty's Treasury" according to the arrangement agreed upon in 1857.

In accordance with this arrangement Brewer provided an account of the MSS. which he edited, adding to his work "a brief account of the life and times of the author, and any remarks necessary to explain the chronology" as required for *The Chronicles and Memorials of Great Britain and Ireland during the Middle Ages*.

The preface records the attitude of the papal legate, Guy le Gros, or de Foulques, towards the barons and bishops of England as given by Matthew of Westminster, and of his interest in philosophy at a period when "nine-tenths of the world were perfectly content with the gross ignorance in which they were shrouded". It appears that Rémond de Laon had mentioned the name of Bacon to the legate when he was Bishop of Sabina, prior to his elevation to the papacy as Clement IV. Brewer stresses the intense joy of the lonely friar at receiving Clement's commission, which explains the seemingly extravagant language in which Bacon replied to the Pope's request. He stresses likewise the extreme difficulty experienced by Roger in complying with the request, on account of the impossibility of raising the necessary funds, owing to his Franciscan vow of poverty. The point is raised as to whether any repayment was ever made to Bacon for the

expenses he incurred in compiling his works and despatching them to Clement.

Believing that the *Opus tertium* was "intended to serve as a preamble to the *Opus majus* and *Opus minus*", Brewer places it first in his volume, and assigns the year 1267 as the date when the three works were completed. Since the *Opus majus* "embraced the entire scope of the physical sciences as then understood", Brewer suggests that "nothing but the force of his own genius and his unconquerable love of the truth" enabled Bacon to overcome the obstacles in his path.

"Willingly do we taste of the tree of good and evil; slow are we to taste the tree of life, to embrace the dignity of virtue with a view to future happiness." This quotation from the *Opus majus* seems a kind of text for the Christians of his day, but, as Brewer states, with the death of Clement IV, Bacon's hopes for "a papacy, splendid for peace, and the regeneration of science" faded and died.

In his preface Brewer quotes a long passage from the *Opus tertium* regarding alchemy, as follows:

"There is another science which treats of the generation of things from their elements, and of all inanimate things . . . of which we find nothing in the books of Aristotle; nor are the natural philosophers or any of the Latins acquainted with these things. And as they are ignorant of these things, they can know nothing of that which follows in physics; as of the generation of animate things, as vegetables, animals and man. . . . And this science is more important than all that have preceded, because it is productive of more advantages. It not only provides money for a state, but teaches the means of prolonging life, so far as nature will allow it to be prolonged; for we die sooner than we ought for want of a proper regimen in youth, and owing to diseased constitutions derived from our fathers. But this twofold science of alchemy is scarcely understood by any; for although many throughout the world labour to make

metals and colours, few know how to make metals, and still fewer to produce those things which avail for the prolongation of life. There are very few who can distil properly, or sublime, or calcine, or resolve, or perform other operations of this kind."

Brewer points out the necessity of distinguishing between the *Compendium philosophiae* and the *Compendium studii theologiae et per consequens philosophiae*, which appeared about 1292.

In his short sketch of Bacon's life he refers to the MS. bearing the title *Breve breviarum fratris Rogeri Bacon ex dono Dei* which he states "is said to have been written to Raymund Galfridus".

Writing of the Brazen Head, Brewer mentions John Ernest Burgravius as contending that the philosopher was "indebted to celestial influences, and to the power of sympathy" for these works. Brewer himself is of opinion that "the Devil had nothing to do with them" but that "they were produced by Bacon's great skill in mechanics, and his knowledge of the powers of electricity" rather than "molten and forged in an infernal furnace". Brewer also alludes to John Picus, Count of Mirandole, who distinguished two kinds of magic; the one due to knowledge of natural causes and effects, and the other to diabolical agency. He points out that the Greeks differentiated these two by the employment of separate words, and that both Bacon himself and William of Auvergne, Bishop of Paris, also maintained this distinction.

Brewer identifies Bacon's promising pupil with John of London.

Writing regarding the *Compendium philosophiae* Brewer believes that Bacon intended to "undertake a work more vast and complete than any he had yet meditated". He states that a MS. in the British Museum (No. 8786) entitled *Baconis physica* is the fourth part of this "encyclopaedical work".

APPENDIX II

NOTE ON THE PAPACY DURING THE LIFE OF ROGER BACON

WE are told by the article on the Papacy in the *Encyclopædia Britannica* (Ludwig von Pastor, Ph.D.) that "the first half of the thirteenth century may be regarded as the grand epoch of medieval history".

One year after the birth of Roger Bacon, the Fourth Lateran Council was summoned by Pope Innocent III to discuss many important questions relating to the reform of the Church. Innocent was a politician and an imperialist and gained immense power.

Gregory IX [1227-1241] and Innocent IV, who became Pope in 1243, seem to have been engaged in a struggle with the Emperor Frederick II, who had been appointed by Innocent III. It was during his papacy that the important Council of Lyons took place in 1245, upon which occasion Grosseteste, the pious and aged Bishop of Lincoln,¹ read aloud to His Holiness and the assembled conclave, a copy of his sermon rebuking the abuses of the Church in England, and

¹ Stevenson, in his *Life of Robert Grosseteste*, states that Roger Bacon constantly spoke of him as Saint Robert, and the rules which he composed for the guidance of the widowed Margaret, Countess of Lincoln, in the management of her estate were all called "Reules of Seynt Robert" (p. 327).

Bacon's admiration for this great man cannot be wondered at, since he found time, in addition to the fulfilment of his many episcopal duties, to write "treatises on sound, motion, heat, colour, form, angles, atmospheric pressure, poison, the rainbow, comets, light, the astrolabe, necromancy and witchcraft". (See paragraph in *Chambers's Biographical Dictionary*, 1899.)

The astrolabe was an instrument used in the Middle Ages for measuring the altitude of the sun and stars.

in his own diocese. (See Stevenson, *op. cit.*, for a full account of the Council of Lyons.)

From 1261 the Pope was Urban IV, being succeeded by Clement IV [1265–1268], the Pope most closely associated with Bacon's trials and endeavours.

Next came Gregory X who was followed by Nicholas III who died in 1281. Martin IV [1281–1285], Honorius [1285–1287] and Nicholas IV [1288–1292] were the occupants of the Holy See up to the time of the death of Roger Bacon.

APPENDIX III

LIFE OF GROSSETESTE BY SAMUEL PEGGE

WE are indebted to Samuel Pegge, LL.D. for *The Life of Robert Grosseteste, the celebrated Bishop of Lincoln*. (Printed by and for John Nichols, Printer to the Society of Antiquaries. 1793.)

This 'country clergyman' provides a gloomy background to the thirteenth century of a Church subjected to the tyranny of the Pope, particularly Innocent IV, with his ecclesiastical appointments, his papal legates, his bulls and excommunications, and his never ending graspings of English monies for his own purposes. One of his worst impositions was the filling of English benefices by young Italians, quite unfitted for their position and entirely unwelcome to Grosseteste.

The Europe of the century possessed, however, an implacable enemy to the papal rule in the person of Frederick II. Pegge relates how, when an embassy of mendicant friars besought the Emperor to desist from his "anger and malice" towards the Church, he reminded them of the disgraceful manner in which the Church had "abused, defamed and excommunicated him". There was no gainsaying these charges (p. 105).

The Romish Church found itself opposed by an 'enemy' of quite a different nature in the courageous Bishop of Lincoln, who did not hesitate to upbraid the Pontiff and resist his encroachments.

Among the writers mentioned by Pegge who bore testimony to the character of Grosseteste was Johannes Trithemius Abbas (p. 99, Edit. Fabricii) well known in Europe for his wide learning, occult wisdom, and alchemical teachings, who is said by some to have instructed Paracelsus. He was Abbot of Spandau.

Grosseteste's knowledge of Greek is attributed to the influence of the Bishop's master and instructor Nicholas the Greek, who had been a student at Oxford and Paris before becoming a monk at St. Albans. Samuel Pegge informs us that some of the Jews resident in Oxford were employed to teach their language, presumably Hebrew, to the students, Jewish manuscripts being possibly available. Roger Bacon mentioned among the very great and learned men who were acquainted with Hebrew "Lord Robert Bishop of Lincoln and Adam de Marisco".

These manuscripts seem to have been brought from France and Italy to Paris where Grosseteste prosecuted his linguistic studies, with the result that he was able to translate those which he believed to be genuine. Roger Bacon stated that this work was undertaken by the Bishop late in life. (See *Roger Bacon* in Wood, 82.)

Pegge is of the opinion that:

"It was on account of his diving so deeply into some curious subjects, into the causes of things and their effects, together with his reputed skill in the mathematics and his acquaintance with languages so rare and uncommon as the Greek and Hebrew, that our academic was esteemed by the vulgar and even by the ignorant monks to be a magician . . . John Gower the poet calls him expressly an astrologer . . . and Conrad Gesner says in his *Bibliothèque* that Grosseteste actually wrote a book on astrology and another on necromancy and sorcery."

This quotation from Pegge is accompanied by a footnote giving the reference as *Goetia* and also by a declaration that the statement attributing the latter work to Grosseteste "is absolutely false". Yet Pegge in his "Catalogue of the Bishop's works" includes both *De lapide philosophico*, Liber I and *De necromantia et goetia*, Liber I.

Pegge assumes that an astrologer meant "a person well-versed in the planetary influences", and he considers the story that Grosseteste, like Bacon, made a Brazen Head to be

“ridiculous”. This may be, but may it not also be that the ordinary layman or divine may fear, as dangerous, subjects which to a Roger Bacon, a Grosseteste and a Trithemius, are worthy of reasonable survey and examination?

Though so learned a bishop, Grosseteste did not think it below his dignity to make a friend of the simple unlettered Agnellus Pisanus, leader of the Franciscans, of whom Pegge states that “they were used to ramble all the world over”. Another scholar “rambled” as far as Athens, bringing back not only Greek manuscripts, such as *The Testaments of the Twelve Patriarchs* but also, according to Pegge, the Greek numerals. This was John de Basing or de Basingstoke, whom Matthew Paris (upon whose records Pegge draws largely for his information) considered a most learned man “a perfect master of the Latin and Greek languages; and also an eloquent orator, a complete mathematician, a subtil philosopher and a sound divine”. He was learned in the *Trivium* (grammar, logic, and rhetoric); and in the *Quadrivium* (arithmetic, music, geometry and astronomy); these two sets of studies were known as “the seven liberal sciences”.

Grosseteste, had, at first, a high opinion of the friars, some of whom, like the Dominican John de St. Giles, who attended the Bishop fairly constantly and ministered to him in his sicknesses, were skilled in medicine. Grosseteste’s indignation, however, was very great when two Franciscans named John and Alexander, acting as papal envoys, laid aside their robes of poverty and “dressed themselves out with splendour”, taking upon themselves “all the state” pertaining to the emissaries of the Pope.

What else could be expected of a régime of which the Bishop exclaimed to the Pontiff on the occasion of his visit to Lyons in 1248, “Oh! Money, Money, how prevalent art thou, especially in the Court of Rome!”

Grosseteste died at Buckden in Huntingdonshire 9 October 1253, and was buried at Lincoln, being succeeded by Peter, a lecturer to the Franciscans, who later was promoted to a see in Scotland.

Another contemporary of Grosseteste was Richard Fishacre, a Devonshire man who joined the Dominicans, and after studying at Oxford, where he was renowned for his learning, became a friend of Robert Bacon, whom Pegge regards as probably the elder brother of Roger, not his uncle.

As for Roger himself, Pegge terms him in two places "a person of nice and most delicate taste" with whom Thomas Wallaeus, or Wallensis, Bishop of St. Davids, found special favour. He also states that when Roger Bacon praises the famous scholars of his time, it is always Grosseteste who takes the lead.

APPENDIX IV

BACONIANA

ANTHONY WOOD, M.A. [1632–1695] was responsible in the seventeenth century for several large volumes entitled *The History and Antiquities of the Colleges and Halls in the University of Oxford*. Printed at Oxford at the Clarendon Press. Printed for the Editor (John Gutch, M.A.). 1785.

On page 39 of Volume I Wood referred to William Shirwoode, stating that John Leland¹ asserts that Shirwoode was Chancellor of Lincoln, and went on to say of Roger Bacon that he “hath erred, who applauding the work of the said Shirwoode by saying that he was wiser than Albertus Magnus, and that no one was greater in philosophy than he, styles him William Chancellor of Lincoln”.

In 1889 the Clarendon Press printed for the Oxford Historical Society *A Survey of the Antiquities of the City of Oxford*, composed in 1661–5 by Anthony Wood, edited by Andrew Clark, M.A.

In Volume I dealing with “The City and Suburbs” there are two allusions only to Roger Bacon. The first concerns the so-called Little Gate, wide enough for the passage of a cart, with a footway through a door for pedestrians, the road leading to the premises of the Friars—Black and Grey.

Above it was a large room used by “scollers”, and it is said that a certain “Peter de Ewe, brother chamberlaine to Thomas the ironmonger” was the recipient of 8 shillings given at the Little Gate by the Preaching or Black Friars.

In a footnote to this statement we find the interesting query, “Did not Roger Bacon take the hight of stars here?” meaning, as we suppose, that the chamber was lofty enough to make celestial observation possible (p. 252).

The second mention is of “a tower with a gate and common

¹ John Leland (circa 1506–1552). Historian and antiquary.

passage underneath" which existed in Oxford in Wood's time and bore the name of "Fryer Bacon his study". Wood would not vouch for the truth of this legend, but thought it likely that Bacon did use the tower which he could reach from the convent by a back way over the stream called Trillmill (p. 246).

In Volume II the items concerning Bacon are more numerous. Discussing the teachers in the Franciscan school, Wood calls Roger "a great critick of his time concerning the writings of such which were before and in his age". Similarly, he stated that the scholars of Merton College called him "*Doctor Mirabilis*" and that Bale¹ called him "*praestigator*".

Regarding the libraries of the Franciscans, Wood recorded that, besides enjoying "the Capitonian library" (that is, the library of Robert Grosseteste) "they were honoured with that of the incomparable Fryer Roger Bacon, who wrote the number of 100 treatises, as by Balaeus they are enumerated".

When the Franciscan libraries decayed, apparently those of Grosseteste and Bacon were sold, some of them, as we have seen, to Dr. Thomas Gascoigne, so that "by the malice, stealth, or slothful negligence of the brethren" the collection of priceless volumes was broken up.

Later, Wood declared that a contemporary and intimate acquaintance by name John Twynus, writing of Grosseteste's works, and also those of "that incomparable mathematician Roger Bacon" showed how the ignorant friars, supposing the volumes to treat of necromancy, fastened them "with long nailes to the desks" so that they "among dust and mothes" utterly perished.

On page 401 Wood quoted Balaeus as describing Bacon as a magician of necromancy, not by the power of God, but of evil spirits".

Among Roger's treatises Wood mentioned "that excellent tract" entitled *De victoria Christi contra Antichristum*, and suggested that on account of "several errours contained

¹ John Bale (1495-1563). A historian of English literature.

therein" (probably errors of doctrine) he was imprisoned for several years by the Pope Nicholas IV.

Dealing with the history of the Franciscan Church, Wood relates that, in his day, he heard that Bacon's tombstone had been dug up sixty-three years before, with an inscription thereon, whilst his last reference is to that "decrepit building" known by tradition as "Roger Bacon's and Thomas Bongai's Study".

According to Wood, Robert was the name both of Roger's uncle and his brother, while there appear to have been two persons of the name of Fisacre. Among Bacon's pupils he mentions Thomas Docking and John Peckham.

APPENDIX V

THE JOURNEY OF WILLIAM RUBRUCK

THE substance of what Roger Bacon learned from William of Rubruck on his return from Central Asia may be gathered in part from *The Journal of Friar William de Rubruque* in a volume published by Macmillan and Co., Limited, in 1900 together with *The Travels of Sir John Mandeville* and *The Voyage of Johannes de Plano Carpini* "unto the Northeast Parts of the World in the Year of Our Lord, 1246". It may be found in full in *The Journey of William of Rubruck to the Eastern Parts of the World, 1253-5 as narrated by himself*. This fascinating, detailed and annotated account has been translated from the Latin, and edited with an introductory notice by William Woodville Rockhill, and issued in London by The Hakluyt Society. (Second series, No. IV.)

The story was addressed "To his most sovereign, and most Christian Lord Lewis, by God's grace the renowned king of France" to whom "the meanest of the Minorites' order, wisheth health and continual triumph in Christ".

Louis IX, called "Saint Louis", was in Cyprus in 1248, where he received an embassy from a Mongol general, with letters which were translated by a Friar Andrew, who knew Arabic and had been with Friar Ascelin's mission in 1247 to the Mongol commander-in-chief. William was with the king at this time, and in 1249 he went with Louis and the crusading forces to Egypt and busied himself in making preparations for a venture which, it was hoped, would bring peace, if not friendship between the Tartars and the West.

Our knowledge of events at this period regarding the Tartars, whose origin is obscure, is derived from a letter sent by the Emperor Frederick II to Henry III, which recorded the Mongol invasion of Europe into Southern Russia, and

which was followed in turn by the overthrow of the Hungarians, Poles and Bohemians. But Europe was torn by the dissensions between Pope and Emperor, and the invasions came to an end with the deaths of both Gregory IX and the Mongol chieftain Ogodai, whose decease required the election of a new Ruler at a vast concourse to be held at Karakorum, in Mongolia.

Friar William was acquainted, not only with the previous mission of Friar Ascelin, but also with the experiences of Friar John of Plano Carpini,¹ who had left Lyons in 1245 on a journey to the court of Kuyuk Khan, and returned safely in 1247. He gained fresh information at Constantinople, from the Armenian traders who resorted thither, and, accompanied by Friar Bartholomew of Cremona, arrived after two months at the court (*ordu*) of Sartach, the son of Batu, the Mongol commander-in-chief.

Sartach had been reported to be a Christian, to whom the friars delivered letters from the Emperor of Constantinople, but Sartach made it plain that he would himself take no action, but would send the messengers to his father. Batu, in his turn, sent the friars to the Emperor Mangu Khan, whose court was reached after an immense journey of cold and hardship, in January 1254. Here they remained for some weeks and William records that "on Palm Sunday (5 April) we were near Caracorum". It was not till Pentecost (31 May), that Mangu returned from his camp outside Karakorum to the city itself, where he held a great Court, after which he handed over to Friar William the letters replying to the King of France. These being interpreted, William himself wrote down their tenor, and departed shortly afterwards, leaving Bartholomew in Central Asia,

¹ *The Voyage of Johannes de Plano Carpini.* (The Macmillan Co. Ltd. 1900.) Bacon was in all probability acquainted with Carpini's own account of his journey to the court of Kuyuk Khan, which he undertook in 1245. Starting from Padua he and his Polish companion, Friar Benedict, reached Karakorum, and returned to Lyons in 1247.

since he was so weakened by starvation and cold that the return journey was impossible for him.

In two months and two days William and his companions reached Batu's camp, exactly a year after leaving it, and continued the homeward journey on 16 October, finally arriving in Cyprus and proceeding to Antioch, which was reached on 29 June 1255. To his disappointment William was directed by the Provincial in Tripoli to remain there, instead of coming to present his report in person to King Louis. In his last paragraph the friar expresses the hope of being permitted to see him "and those particular friends . . . in your kingdom". Among his friends he surely numbered his fellow-Minorite Roger Bacon.

William Woodville Rockhill reckons this French explorer's journey as totalling about 10,000 miles, and the distance from Batu's camp on the Volga to Karakorum as about 2,600 miles. He states that William accomplished this distance in 70 days; therefore he suggests an average of $37\frac{1}{2}$ miles per day.

As recorded by the traveller himself, the first part of the distance to Batu's *ordu* was undertaken, mistakenly, in ox-carts; otherwise relays of horses were used all through the day, and sometimes on into the night. From his own account, William appears to have been an intrepid horseman, and to have combined courage and courtesy with shrewdness and caution in his dealings with the Tartar authorities.

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