

TEXTOS Y TRADUCCIONES /
TEXTS AND TRANSLATIONS

ROGER BACON

LETTER TO POPE CLEMENT IV

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Resumen

El texto aquí presentado es la primera traducción de la *Carta al papa Clemente IV* de Roger Bacon, que fue editado por F. A. Gasquet en 1897. Es la carta de Roger Bacon introductoria al *Opus maius* que envió al papa Clemente IV en 1267, junto con su obra principal, y que resume su proyecto de reformar las ciencias y la sociedad de su tiempo, como se describe en su *Opus maius*.

Palabras clave

Roger Bacon; *Opus maius*; *Carta al papa Clemente IV*; reforma de las ciencias en el siglo 13

Abstract

The text printed here is the first English translation of Roger Bacon's *Letter to Pope Clement IV*, which has been edited by F. A. Gasquet in 1897. It is Roger Bacon's introductory letter to the *Opus maius*, which he sent to Pope Clement IV in 1267 together with his fundamental work, and which summarizes his project of reforming the sciences and society of his time as described in his *Opus maius*.

Keywords

Roger Bacon; *Opus maius*; *Letter to Pope Clement IV*; Reform of Sciences in the 13th Century

Letter from Pope Clement IV to Roger Bacon

To my beloved son, friar Roger, called Bacon, of the Order of Friars Minor. We have received your letters which were addressed to us with great joy; and we have listened very attentively to the conscientious and prudent explanations which our beloved son William, called Bonecor, has given us orally to explain your letters.¹ In order that your intention may become clearer to us, we want to let you know, and we do so by mandate in an apostolic letter, that you will not fail to send us as soon as possible that work which we have asked you to communicate to our beloved son Raimund of Laon when we were still in an inferior office. And we entrust you with this task notwithstanding the contrary provision of any superior or any regulation of your Order, and it shall be written in beautiful script. And also explain to us what you would propose as a remedy for the dangers you have recently described: and do this immediately and as secretly as you can.

Written in Viterbo, on the 10th calends of July [22 June] of the second year [of my pontificate 1266].²

Chapter 1

Salutation to Pope Clement IV and Roger Bacon's delight in the task³

{497} To the Holy Father and Lord Clement, Supreme Pontiff by the Grace of God, whose servant of his Holiness kisses his holy feet.

Because the honor of such a great reverence – so full of wisdom and of such indescribable brilliance of eloquence – has driven me unworthy of my position to send you my philosophical writings, I humbly request that it be attributed not only to my weakness but also to your mighty, wonderful inclination, if I should fail to pay the proper reverence, if I should apparently fail to welcome such a great honor, if I should become speechless and if my pen may tremble. {498} For who could be so full of witty ideas, what power of mind could be so powerful and what power of memory so tireless, and where could there be found such a splendor of eloquence, such an unprecedented mode of expression, and such a great power of speech, by which the concession of your sublimity could be adequately expressed?

After all, the head of the Church has visited someone who is not even worthy to be the sole of his foot. The Vicar of the Savior, the Lord of the whole world, has decided to

¹ Cf. for the history of the *Opus tertium*: Massa, E., *Ruggero Bacone. Etica e Poetica nella Storia dell'Opus maius*, Rome, Edizioni di Storia e Letteratura, 1955, pp. 7-23.

² Cf. for this letter to Bacon from Pope Clement IV: Roger Bacon, *Opus tertium*, Lat.-Ger., ed. and transl. N. Egel, Hamburg, Felix Meiner Verlag, 2019, p. 4.

³ The translation (with page numbers in {} brackets) follows the edition of: Roger Bacon, *An unpublished fragment of a work of Roger Bacon*, ed. F.A. Gasquet, *The Historical Review*, 12 (1897), pp. 494-517. Divisions in Chapters and Headings are mine, not in the original.

appoint unworthy me, who can hardly be counted among the various parts of the world. The sun of wisdom, which illuminates the world, the wonderful vessel of the magnificent heavens, with the rays of its command, reaches a man shrouded in shadows through the multiple darkness of ignorance, and even commands me to create a monumental work. The Prince of the word, who is so rich in the joys of eloquence, has ordered someone who stammers and who lacks not only the rhetorical embellishments of high Latin but also its initial grounds, to write something and to prepare a written treatise!

However, truly: the honor of this command, which is almost immeasurable and infinite because of the sublimity of its commissioner, allows me to overcome my weakness, because I feel through this powerful impulse that I can far exceed my own humble powers. I feel a fervent enthusiasm, rise with new vitality, rejoice with extreme passion and jubilate with the greatest excitement at the friendly concession of the one who gave me this commission. I am not only grateful, but I must be extremely grateful, because your Holiness drives me to be able to actually realize what I have desired with fervent desire, what I have pursued with great effort and at great cost! For even if the corner stones have not yet been laid, the wood and stones are already there, namely the power of the sciences and the languages; and I will carefully study how the other buildings necessary for wisdom have to be constructed. For the marvels of the arts and sciences are currently subject to great difficulties, especially in the times that are approaching the days of Antichrist and his followers, towards which he will be furious and angry, so that the study of wisdom will be oftentimes confused, as will be clearly shown below. Therefore, without special apostolic foresight, no remedy will ever be able to be provided against this danger. But when your authority reigns, there can be no obstacle, for your power will rule the heavens, dissolve purgatory, trample down hell and embrace the whole world. Since your sovereignty has commanded me to send you my philosophical writings, I will therefore, in this preceding letter, set forth the views of the philosophers in the most certain manner appropriate and fitting to each work and investigation.

I am also guided in this by the authority of Augustine, who, in the second book of *De doctrina christiana*,⁴ expresses the view that the gold of wisdom and the silver of eloquence of the philosophers must be recovered by Christians as from unjust owners. All the Holy Fathers of the Church also agree on this, as will be discussed in more detail in the appropriate place. But diversity helps the reader to learn, as Pliny says in the 14th Book of his *Naturalis historia*,⁵ and from the same thing, the mother of tedium, results

⁴ Cf. Augustinus, *De doctrina christiana*, ed. J. Martin, Turnhout, Brepols, 1962 (= CCL 32), II, 40, 60, 144.

⁵ Cf. Solinus, *Collectanea rerum memorabilium*, ed. K. Brodersen, Darmstadt, Wissenschaftliche Buchgesellschaft, 2014, Praefatio, 4, p. 16.

spiritual reluctance and indignation, as is taught in the book *De planctu naturae*.⁶ In this sense, Seneca also writes in the book *De copia verborum*, that «there's nothing pleasant save what variety freshens»⁷. Therefore, I will sometimes cite several authorities on the same subject.

Praise be to God, the Father of our Lord Jesus Christ, that he has placed a wise ruler on the throne of his kingdom, who is carefully dedicated to the study of wisdom. The predecessors of your Beatitude were, of course, occupied by other ecclesiastical matters and, moreover, often harassed by obstinate princes, which is why they could not let their minds be guided and calmed by such a study [of wisdom]. But by the authority of your virtue, as the right hand of God, the flag of triumph has been erected above heaven, the sword has been withdrawn, the hostile parties have been thrown into hell, the peace of the church has been restored and the reign of joy has been granted to all believers – and all this because {499} the inexhaustible depth of your intellect has miraculously created a time for reflection which is favorable to the wise. Because after the confusion has been settled, the soul becomes wise and prudent, as Aristotle writes in the seventh book of the *Physics*;⁸ and in the second book of *De somno et vigilia* he affirms that the spirit is highly capable of understanding important and secret truths, as soon as it has been freed from the worries and troubles of this world. But each one is obliged, according to his peculiar ability, to engage in the wide variety of ecclesiastical activities and duties; and above all, those who are in the forefront must be concerned with the salutary promotion of scientific activity.

In this matter I would like to use the expression of Aristotle in the third book of his work *De anima*:⁹ The speculative intellect that considers the truth becomes practical by extending it to the love of goodness, because reason precedes right will and leads it to salvation. For we cannot do good if we do not know how, and we cannot avoid the evil that is unknown to us. Therefore, while ignorance prevails, there is no remedy for evil, because the man shrouded in darkness has fallen into sin like a blind man into a pit – which is why no danger can be compared to ignorance. But he who knows the truth possesses it, even if he sometimes ignores what would have to be done: yet he can return to his convictions, regret his transgressions and beware of future evils. Thus, there is nothing more worthy than the study of wisdom, by which one escapes the mist of ignorance and by which the human mind is enlightened so that it chooses what is good and avoids every evil. Moreover, those who are eager for knowledge do not only serve themselves, but are preferred for any leading position within the Church. They become the leaders, directing the whole multitude of the laity, converting heretics and

⁶ Cf. Alanus ab Insulis, *De planctu naturae*, ed. J.B. Köhler, Münster, Aschendorff, 2013, Prose 5, p. 136.

⁷ Syrus, P., *Sententiae*, Lat.-Engl., *Minor Latin Poets*, ed. J. Wight Duff and A. Duff, Cambridge (Mass.), Harvard University Press, 1934, p. 51, l. 278.

⁸ Cf. Aristotle, *Physica*, ed. W.D. Ross and J.A. Smith, Oxford, Clarendon Press, 1930, 247b25.

⁹ Aristotle, *De anima*, Gr.-Engl., ed. and transl. R.D. Hicks, Cambridge, Cambridge University Press, 1907, 433a 9ff.

other unbelievers and giving advice on how to strike back the unruly and those destined for eternal death. Consequently, the happiness of the whole world depends on the study of wisdom, but from a contrary attitude comes its loss, and the whole world is thrown into disorder.

Chapter 2

Reason for the letter and obstacles facing the work

Because your Greatness commanded me to write back as soon as possible, I was restless and in a hurry. For if a request from friends must already be fulfilled quickly and with full devotion, so that it does not seem as if the love dedicated to the scientific activity is cooling off (as already Platearius¹⁰ wrote, an expert in the field of medicine), all the more the will of the rulers, and most of all the will of the ruler of the world, must be fulfilled as quickly as possible. For as Sallust says in his book *De bello Iugurthino*: «Nothing hastens quickly enough for the soul that desires.»¹¹ And Seneca, in his famous book, says: «Desire finds even quickness slow.»¹² The same author writes in his seventh book *De beneficiis*: «That is received more graciously which comes from a willing than that from a full hand.»¹³ Thus Ovid, too, expands on Solomon's words in his *Tristia*: «Anxious hope distracts the mind and consumes joy by its long promise.»¹⁴

However, I not only believe that no delay can be tolerated anymore, but I have also decided that the commissioned work must be continued with all my strength. Because I am bound by the strength of your power, I cannot hide anything: if it were not for your commission, I would still be in the situation of being ashamed to have neglected your apostolic grandeur. Moreover, the matter under discussion here (because, after all, it is a matter of the blessing of wisdom) by its very nature invites each one to freely communicate it. As Boethius says in the prologue to his work *De hypotheticis syllogismis*: «Even if the contemplation of truth must be done in the way that is appropriate to it, it is nevertheless all the more amiable if it is made accessible to the public. No thing is indeed good which does not shine more beautifully if it be confirmed by the awareness

¹⁰ Cf. Platearius, *De febribus, Ioannis Serapionis*, in: *Opus totius medicine practice*, ed. O. Scotus, Venice 1530, f. 169r.

¹¹ Sallust, *Iugurtha*, ed. and transl. J.C. Rolfe, Cambridge (Mass.), Harvard University Press, 1921, 64, 4, pp. 274-75.

¹² Syrus, *Sententiae*, op. cit., p. 38, l. 176.

¹³ Seneca, *De beneficiis*, ed. and transl. J.W. Basore, Seneca, *Moral Essays*, vol. 3, Cambridge (Mass.), Harvard University Press, 1935, 1, 7, 2, p. 26-27.

¹⁴ Cf. for this quotation: Roger Bacon, *Compendium of the Study of Theology*, Lat.-Engl., ed. and transl. T.S. Maloney, Leiden et al., Brill 1988, p. 121, n. 7.

of a greater number.»¹⁵ And Seneca, in one of the first *Epistulae morales ad Lucilium* says towards the end:

I rejoice to learn more so that I may teach; nor will any thing please which I am about to know for myself alone, granted it be exceptional and beneficial. For if [it would be the case] that wisdom be given me with the provision that I hold it hidden and that I do not proclaim it, I would refuse it, {500} for an enjoyable possession is of no value without a partner.¹⁶

Likewise said the great King Alexander of Macedonia, disciple of the great Aristotle, when he invited Dindimus, King of the Brahmins, in a philosophical conversation that had arisen between them, to share his wisdom:

The sharing of wisdom is a free thing, not knowing loss when, shared, it is transferred to another, just as if you kindle many lamps from one flame you cause no loss to the principal matter which acquires the ability to kindle more as often as one finds reasons for it to manifest [itself] more.¹⁷

But it is now possible for me to eagerly fulfill what I was ordered to do. To the best of my ability I am highly willing before God; but what you demanded when I was in another profession¹⁸ has not been completed, though you did command it. For it is true that many years ago I had decided to record my knowledge in writings, and this has become known to most people. In my other status, I had written many things, especially to teach the young people, works that many people think I should rewrite. Moreover, because I had already been externally occupied for ten years due to numerous debilitations and illnesses, and therefore had no leisure time for scientific activity, it is, moreover, common knowledge among some people that I now wanted to devote myself entirely to writing. But I have written nothing, except what I have collected in some chapters at the request of friends, sometimes about one science, sometimes about another – and sometimes only in a very provisional way. Therefore, neither in my first nor in my present state have I written a complete work on any field of philosophy. And neither have I produced anything to be grateful for, nor is it worthy enough to be presented to your wisdom. Moreover, I no longer possess what I have written, for I have not preserved these writings because of their imperfection. Nevertheless, I have, as far as I could, made many obligatory considerations for preparing these writings, and I have already arranged everything to build a structure of teaching wisdom – even if it

¹⁵ Boethius, *De hypotheticis syllogismis*, Lat.-Ital., ed. and transl. L. Obertello, Brescia, Paideia, 1969, I, 1, p. 204.

¹⁶ Seneca, *Ad Lucilium epistulae morales*, ed. and transl. R.M. Gummere, Cambridge (Mass.), Harvard University Press, 1917, 6, 4, p. 26-27.

¹⁷ The source of this quotation is unknown, cf.: Bacon, *Compendium of the Study of Theology*, op. cit., p. 121, n. 16.

¹⁸ Before Bacon's entry in the Franciscan Order.

has not yet been created. Which is why Raimond of Laon, who spoke with your Grace about my writings, did not understand my intention at all.

It has certainly become known to your Glory – as your two commissions show – that I was obliged by an extremely strict command (which applies to the entire Order) not to communicate what I had written in the form that I had actually created it, and I was therefore reluctant to write it in its entirety. Because whether I want it or not, it could only be written if it were copied by scribes who also would have copied [my works] for themselves or for friends, and they would therefore communicate it to all people. For I have seen on several occasions that extremely secret writings have been spread by the deceitfulness of the scribes, and consequently a guilty conscience would afflict me because I would have violated the rules. Moreover, I have refrained from the writing of scientific works because I could not share them with my very dear friends and the necessary spiritual supporters – without whom I am not able to do anything. Indeed, I have a learned friar and also other very esteemed friars, but I could not count on their help unfortunately. That is why I decided to stop writing altogether, especially since none of my superiors encouraged me to write.

There were also other things that prevented me from writing: a prolonged period of exhaustion and a lack of funds and sponsors. In fact, no one is able to accomplish extraordinary things without the help of others. In any case, the daily urging of my spiritual superiors made me obedient to other occupations, and therefore I could not execute what I wanted to do. Rather, I began to despair given the obstacles which had accumulated, and I was indifferent to many useful and magnificent insights which I had collected by means of various copies, transcriptions, and other great efforts over a long period of time before I first received the commission of your Highness. Now, then, because your apostolic Grandeur has assumed that I have completed the writings that it has asked for, and that I have already made notes that are suitable to be transmitted in writing, I humbly bow my knees: {501} Oh may my Lord accept the apology that his young servant puts forward in these matters!

For because I have shown myself to your Majesty before God as one who is ready for such a task, I have understood that the writings that were not written then must be written now. But after I received your papal letters, I thought in secret about what I could return in gratitude to the Vicar of Jesus Christ. I have made every effort to do so, since I have set myself the goal of completing the desired work by the time after the feast of Epiphany of the Lord. And I have put together many such things, written down even more, and made numerous copies, so that, after a final examination, I may obtain a single work written in one copy. But because of the dignity of the work and the well-known peculiarity of wisdom itself, I could not accomplish what I had so longed for in time because of the obstacles which had arisen.

For though it may be very easy for a man who is scientifically well educated to reinforce fragile truths to infinity and to extend and boast about insignificant things, it is not worthy of a wise man, for this behavior would bring everything to a standstill and

put an end to wise deliberation: for it is not important to disperse a few things, but to direct several things in a straight path. It is therefore foolish to use one's abilities violently on vain things and to neglect the marvels of wisdom, of which one alone surpasses the many thousand things that are spread everywhere. Also, the world is already full of writings by which meaningless and childish teachings are spread. This is why I have no intention of putting together anything of this kind unless the secrets of wisdom may require it, inasmuch as they cannot be grasped without the smaller things.

I would now like to move on to the mysteries of the sciences, not only from a philosophical point of view, but also in so far as they are necessary for the attainment of divine wisdom, because – as has been shown above – another [wisdom] cannot accomplish anything.

I am not only writing in order to acquire them completely in a bookish manner, but for other [and more important] reasons: namely, to be strong enough to guide the Church and the Christian community, to convert the unbelievers and to strike back [against] those who cannot be converted, so that they are not pushed back less by the effects of wisdom and the influence of the Church than by warlike undertakings – things that are all sufficiently possible for and worthy of your Majesty. That is why I could not write my treatise in such a short time, and certainly it is not within my power or anyone else's in this world to accomplish it all alone, because it requires the cooperation of several wise men. For anyone can easily consider himself a specialist if he thinks he can give an opinion on small matters, and yet he is often found wanting once he has been led into another field. It is therefore necessary to listen to the advice of others on great matters. After all, even the builder of a great building cannot split all the wood and chisel all the stones, nor can he erect all parts of the building with his own hands. Even if he knows how to do all this, it still requires different carpenters, sculptors and workers to build what is less demanding. It is the same here as everywhere else, for otherwise the author of such a valuable work could not possibly fulfil what he intended.

In addition, a large amount of parchment and scribes are required to make different copies of the same script before a single one can be completed without error. After all, we see in the assemblies of the spiritual dignitaries and the princes that a single writing passes through many hands before the examined writing receives a bull or a seal. Because of the difficulty and importance of these matters, it is necessary to produce numerous writings before we can have a clear and lasting examination. For there are six conditions necessary [for this]: that the expression is appropriate, that what is cited is true, that it is exquisite and essential to the subject matter being dealt with, and that it is short, clear and perfect.

Since I feel my own weakness, I do not write anything difficult, so that it does not take more than four or five copies before I have what I intend. But apart from the scribes there are other persons needed who supervise the errors and carelessness of the copyists {502} and who not only correct what is written but who are also well versed in figurative representations, in numbers and in languages. Because without these things

nothing can be presented brilliantly clearly, in order to keep what I want to bring to your Grace in an appropriate manner. That is why there is more effort in the works of wisdom needed than any ignorant person can imagine. Moreover, nothing can be accomplished without the instruments of astronomy, geometry, optics and many other sciences, for it is by the means of these sciences that we gain knowledge of the celestial bodies which are the causes of the changes on the continents down below: but we are not able to recognize the effects without their causes.

Since without such instruments the realization of great things is impossible, their possession is extremely necessary, even if only a few [of such instruments] were invented by the Latins. In addition, copies of all scientific books are required, as well as copies of the ancient orators and scholars, which cannot be found in my library or in anyone else's. They should, however, be collected by the wise men's librarians across various fields. And finally – since the authors contradict each other in many things and have written down many things on the basis of mere rumor – it is necessary to check the truth of the evidence, as I demonstrate in the treatise on experimental science. This is why I have often sent messengers across the sea – both to various other areas and to large commercial markets – to see the things of nature with my own eyes, and to test the truth of creation by sight, touch, smell, sometimes even hearing, and by the certainty of experience, since I could not observe their truthfulness by books alone – just as Aristotle sent several thousand people to various regions to learn the truth about the things of this world.¹⁹

It follows from all this that many and great expenses [for such a work] are required to which I did not have access, especially because my relatives and friends – which fought on the side of the King of England – have been ruined as much as the King himself. Because of the commission of your Greatness, I have sent a message to England asking for money, but since [my relatives] have left my homeland, and since the King's enemies are occupying the territory, I have not received an answer to this day.

Moreover, I was hindered by a particular obstacle from my superiors, who always demanded something else from me. But I could not sufficiently justify myself, because your Sovereignty had finally ordered me to carry out this enterprise in secret, and because your Majesty had offered them nothing to excuse me. Because of my miserable situation, I was forced to come back to the one who could get all the means needed: if only he would point out the importance of such a great task, if only he would show what would have to be demanded for its accomplishment, what would stand in the way of its execution and how to remove every obstacle so that the will of the Lord would be accomplished in everything. I would advance my endeavors to completion [with your help] a thousand times more advantageously and gloriously than without your knowledge and assistance. For all these things are not in the power of everyone; and

¹⁹ Cf. Plinius, *Plinii Secundi naturalis historiae libri XXXVII*, ed. L. v. Jan and K. Mayhoff, Stuttgart, Teubner, 1967–2002, 8, 17, 44.

they can only be practically realized under the supervision of the one person who holds the wealth of power.

No wonder, then, that nothing splendid or outstandingly sublime can occur within the Church, when it is neglected by the one whose creative power flows through the whole body of the Church. Since the predecessors of your Holiness have not for some time now stretched out their hands to the helm of science, the mysteries of science and the arts – which are extremely useful for the Church of God, for the community of the faithful, for the conversion of the unbelievers, and moreover for the repulsion of those who cannot be converted – remain necessarily neglected and unknown to spiritual dignitaries and Christian princes. The same is true of the majority of students and their teachers, although God has always saved the wise who know all that is necessary for wisdom. But not because a single one knows every single detail or the majority of things, but because one person knows one thing while another person knows another thing, so that all sages of this kind could unite. It is by your authority that wisdom can be fully accomplished, both in itself and in relation to the four areas mentioned above. And it is thereby possible not only to grasp the fullness of wisdom but also {503} to effectively exclude all untruth – such as, for example, the magic arts and heretical wrongdoings that have taken root among the unbelievers and that are of use to the Antichrist and his followers – so that the Church has at her disposal numerous remedies of wisdom against them.

Chapter 3

Concern of the preliminary work

But though I do not deliver the main work, I am nevertheless happy to present, according to my ability, the strong and deep roots of wisdom to your Greatness, as well as the upwards extending branches with the sweet fragrance of their flowers and the sweet taste of their fruits, as well as a sufficient amount of writings until it may please your Holiness to ask for greater things. For these reasons, the intention of the whole work shall be openly shown in this letter. But before doing so, it is necessary to exclude some things that might be objected to my endeavor.

If your Greatness will find words of explicit praise or rebuke scattered here and there several times [in my writings], you should know that the matter itself to which I refer requires this, as will become clear by the order of this treatise. Indeed, as Aristotle²⁰ says, the correct mode of expression must be sought according to the matter in question. For if the style does not correspond to this subject matter, it is inharmonious and ugly, and is not able to enlighten the truth. Therefore, when I sometimes insert solemn words, one should not be surprised, because the importance

²⁰ Cf. Aristotle, *Nicomachean Ethics*, ed. and transl. T. Irwin, Indianapolis/Cambridge, Hackett Publishing Company, 1999, IV, 2, 1120b 1, 3, 1094b11-14.

of the matters dealt with requires such things urgently. This is why my style of writing is not due to pleasure or exaggeration, but rather to the awareness of being close to the truth. In order not to appear like someone who hopes for extraordinary things, I speak only because I wish to please God and his representative, which I desire consciously and knowingly from an unquestionable feeling. And because I am bound by the mandate of your Sublimity to send a wise scripture, I did not wish to keep the truth secret, for otherwise I would have betrayed the goodness of your Grace. Therefore, everything should be presented in a way that is appropriate.

Moreover, I would otherwise give up respect for wisdom and, as I will briefly explain, I would have to be considered simple-minded by every wise man. For because your Majesty has commanded that a philosophical writing be sent, I must trust that I can do this as profitably as possible. I show the utility of philosophy in its complete nature with the help of seven sciences, without which one cannot know anything about philosophy, but by whose help it is easy to pursue the other sciences.

Since I show that philosophy is perishable and useless, even harmful and despicable, unless it is dedicated to the wisdom of God, and that, moreover, it is indispensable to its mistress [theology] beyond all measure, the benefit of philosophy, as desired by your Holiness, can be illustrated to you only by reference to divine wisdom. I show the utility of philosophy in its complete nature with the help of seven sciences, without which one cannot know anything about philosophy, but by whose help it is easy to unfold the other sciences.

The first benefit of philosophy, then, is that it is significant as long as it is pursued for a higher purpose, but the second [benefit] is far greater, and the third is certainly the greatest and immeasurable: for it consists in the fact that philosophy serves wisdom entirely, in so far as it relates to the Church of God and to the other three areas. Because philosophy is useful in such wonderful ways, I would have withheld much about the utility of philosophy if I had not explained this in more detail. That is why I consider these seven [sciences] exclusively together with the wisdom of God, which refers to the Christian Church. If the other sciences have also been spoken of, and if the benefits of philosophy are fulfilled in them, there is nothing more than what is necessary [for the study of wisdom]. For whoever could understand and carry out what I am writing, would be perfect in wisdom; that would be enough for man in this life, both for himself and for the whole world.

Consequently, I write all these magnificent words because of the mandate of your Majesty, and although you do not order me by command directly, I am glad that I have made my convictions freely available, since I have now shown to the Vicar of God and to all mankind what is useful. For if my scripture urges {504} strongly to carry out the useful services that I describe, that is certainly good; if not, at least God will forgive me.

Similarly, one could doubt the possibility and certainty of the things I cite. But even if Pliny may say in the prologue to his *Naturalis historia*: « It is a difficult task to give

novelty to what is old, authority to what is new, brilliance to the commonplace, light to the obscure, attraction to the stale, credibility to the doubtful »²¹, it is nevertheless the case that, by the authority and unanimity of the wise men from the beginning of the world and by reason, it is easy to prove everything I have presented, even if experience may not show it openly. Nevertheless, it is possible that everything I have presented may be done by the power of philosophy; and art and nature suffice for this purpose. That is why [my undertaking] will not be an impossibility neither on the side of the things being created nor on the side of philosophy, and certainly not on the side of man, if the papal authority supports it, since its help is immeasurable. For if the Roman Church, as a result of the execution of all the things that I am describing, should shine forth, there can be no doubt that all things can be accomplished in time, because the books of complete wisdom can be found, as well as the wise men to understand and execute all these things, if it be necessary. They would only have to be honored by means of appropriate positions, and all necessary things would have to be provided, which is nothing for your apostolic power. Such wise men I would suggest to your attention, which I could employ like a grindstone that would stir up their knowledge.

But I do not undertake to examine all things individually, nor do I alone suffice to do so, though all things could be confirmed by appropriate works. Since your apostolic Greatness requires it, I would be foolish, even extremely foolish, if I were to present to your Honor anything containing an untruth. I therefore write in the face of God and from a clear conscience, because I believe that truth is grasped by the individual. And your Wisdom should not be troubled by the fact that much of what I write is contrary to what is believed by the multitude, by custom, and by numerous authorities. Because all of this is apparently removed by the treatise I am sending.

For I show that from the beginning of the world the causes of all evil have been bad customs, the views of the multitude, and dubious and unworthy authorities, which have been accepted by many who have praised what they knew and rebuked and neglected what they could not understand. These causes still prevail today and will prevail until the end of the world. In spite of these [causes], the saints, the philosophers and all the wise men have always been able to grasp the truth as best as they could and resist [these causes of errors] by their efforts, as I point out using multiple authorities and experience. For [in spite of these causes of error] God created from the beginning of the world through various times people who could not give up the truth, no matter what danger threatened them, although it was not always in their power to show the ways of wisdom because they had to wait for God's will. This is why Noah, Abraham, Moses, Jesus Christ, the Apostles and the Saints appeared, as I will show in detail in the first part [of my *Opus maius*]. That is why I am not confused when I speak about the truth known to me, even if there are less people than appropriate among the crowd of the Latins who are able to comprehend this by their own intellectual power. But if they were instructed, by the grace of God, there would be many who would fervently accept

²¹ Plinius, *Naturalis historia*, op. cit., Preface, I, 15.

the truth and reject all deviant ways. For most of them are born for the truth, but they find no one to impress the truth upon them and to explain it to them.

Even if I have chased these general reasons for all our evils with all my criticism, because I want to base everything on reliable authorities and the attitude of the wise and experienced (of whom there are very few), your Venerability shall not believe that I want to incite your holy Meekness {505} to attack the dubious authorities and the crowd by force; nor that I want to cause anger to unworthy people about the state of the studies in the shadow of your fame: for I am only concerned that I can collect a few falling crumbs from the richly laid table of God's wisdom. I think the greatness of your power will be able to provide for itself and its successors the perfect fullness of beneficial wisdom – not only in absolute terms per se, but also in the four areas already mentioned. For when the insight of your Holiness will have attained a greater certainty in these matters, the authority of your judgment will easily be able to convince also the learned and the wise, that those who thirst for wisdom will seek with the greatest joy to attain that which at present cannot be understood by the multitude of students. And moreover: what is sufficient for the multitude, hope will provide.

For Jerome says in *Isaiah*: «The multitude easily changes its mind after being instructed in the truth.»²² And this is true except when the mass is in the hands of foolish leaders. For even if the crowd in general tends towards evil and all too often has a weak leader, it can easily be led to virtuousness (even if only imperfect), if its leader does not hinder it. For the multitude is fickle, and once set in motion it cannot maintain the appropriate measure, so it can easily be directed to the opposite if its leader so decides. It swings through the wind of every doctrine like a reed; and what pleases its leader has the force of law for it. We see, therefore, that every gathering of people is moved according to the will of its head. If the leader disregards the good, the multitude falls into a deep slumber; if he urges it to do bad, it runs there with all passion; but if he instructs the masses to do good, it rushes in that direction just as recklessly. If he should admonish it to perfection, the crowd at least smells it from a distance, even though they certainly cannot taste perfection – which cannot be expected of them either, as I shall show in a suitable place. And even if your time should not permit you to complete everything for the masses, your Glory will at least be able to lay the foundation stones, uncover the springs and plant the roots, so that your successors may more easily complete what you have so happily begun.

²² Hieronymus, *Commentariorum in Esaiam libri XVIII*, ed. M. Adriaen and G. Morin (= CCSL 73 u. 73A), 2 vols., Turnhout, Brepols, 1963, vol. 1, 3, 7, p. 50.

Chapter 4

About Roger Bacon's messenger John

But since a written record is not sufficient in important matters, but an oral discourse is necessary, which has a greater power, and since your Highness has long been occupied with the governance of the Church and with difficult matters of ministry, and since, moreover, the obligations of the Apostolic See do not leave much time to study, I was more interested in sending you a suitable messenger in my place than to compose a complete written treatise.

For these three reasons, it is necessary to send you an intermediary who can answer many things, even though the desire of your Glory may not be fully satisfied and my work will perhaps not be as useful as I would wish. Therefore, out of a childlike and extremely devoted feeling, I am speaking as it were to a revered Father, whose benefits and honor I fervently desire to increase, especially because of the multiple worthiness of your person, since you are in the place of God and hold the world in your hands. I am considering here only what is dignified and useful and must necessarily be presented therefore. And although I perhaps have to admit that there are many who would be better placed than I to impart what I am dealing with here to your wisdom, each one has his own approach and rejoices in his own view. That is why no one, however wise, is able to explain what I have written according to my own will, unless he has discussed my intention with me, and unless I have been able to explain my approach to him – which may be due more to my own weakness than to someone else's.

Since I am absent and the mediation by a messenger is necessary {506}, who must be as suitable as possible for it, I have sent John²³, in whom many merits are united, so that I cannot be accused of any negligence in this matter, if it should please you to make use of the service of this messenger. But even if he is better than I can express, God is my witness that I mention him only for the benefit and honor of your Blessing. If I had been concerned only with the appropriateness of the messenger, I would have found others who I hold in higher esteem and who are actually closer to my heart. For he is not related to me and I met him only seven years ago in Paris. Moreover, I took care of him only because of God and the goodness of this young man, because I thought that he could become an extremely useful vessel for the Church of God. But if I had chosen someone only for my own benefit, I would have found someone wiser who would have taken better care of these needs, which is why I see the reason for my actions solely in the divine greatness of your Majesty.

Because this young man has been instructed by me for seven years – thus also since the time I received the commission of your Venerability – I have instructed him especially in the things that were important to me, which is why I could not find anyone

²³ Cf. Hackett, J., «Bacon and his First Interpreter, the Anonymus Iuvenis Iohannes», in C. Pantani and N. Polloni, (eds.) *Vedere nell'ombra: studi su natura, spiritualità e scienze operative offerti a Michela Pereira*, Florence, SISMELE, 2018, pp. 179-192; see also: Bacon, *Opus tertium*, op. cit., ch. 19, pp. 125 ff.

in this world more suitable for the delivery of the present work. Even though there may be someone more experienced in one science, another person in another, and a third in several of the sciences I have dealt with (and certainly in many others), about which I am not writing here and of which he therefore knows nothing or very little, no one is as instructed in what I have written in general as that young man. For he can give answers in most things concerning languages, mathematics, perspective and the first part of the experimental sciences (which, because of geometry, contain extreme difficulties). Nevertheless, I am sure that he can neither satisfy your wisdom nor the greatness of things in every respect, and that, moreover, he cannot convince you of everything he knows as easily and clearly as he ought to. But this is no wonder, for he is young and inexperienced in passing on his knowledge. He has simply not yet extracted the blossoms and fruits from the roots, which he nevertheless takes up with zeal.

But I send you this young man not only because of the urgency of your command, but also for two other reasons. One reason I explain here, the other in a suitable place. For what I am writing is extremely important and very difficult due to the ignorance of the students. Therefore, anyone who reads this, unless he is an extremely wise person, will despair and consider it accessible only to a divine or angelic mind. But this boy shows that these things are immeasurably easy as long as they are sufficiently explained. For he understands everything written by me without difficulty by my oral instruction; and the writing I send he understands to a great extent from within himself, though he is an inexperienced boy who was poor and could not afford books or teachers, and who could not devote himself to study, since he had nothing except what I had requested for him from some friends. Moreover, he did not find suitable teachers and did not even have the period of a single year to devote to everything he had learned, because he had to take care of the things that were necessary for his livelihood. To what extent will we seniors, who are experienced and have a mind trained in wisdom, then be able to understand all that a trusted mediator teaches us? There is certainly no comparison here.

For Aristotle says in the sixth book of his *Ethics*²⁴ that young men cannot be wise in most issues because they are lacking experience. And in the third book of *De anima*²⁵ he says that the mind trained by wisdom is more receptive. Furthermore, in his argument about the immortality of the soul, which he conducted with the magician Simon²⁶, blessed Peter states that the mind does not weaken with age as a result of the decay of the body, but rather blossoms and becomes more effective. Tullius [Cicero] teaches the same thing in his book *De senectute*²⁷. We ourselves see this also in a human being who

²⁴ Cf. Aristotle, *Nicomachean Ethics*, op. cit., VI, 8, 1142a14-15.

²⁵ Cf. Aristotle, *De anima*, op. cit., IV, 4, 429b6-9.

²⁶ Cf. Ferreiro, A., *Simon Magus in Patristic, Medieval and Early Modern Traditions*, Leiden, Brill 2005.

²⁷ Cf. Cicero, *Cato the Elder on old age*, in: *On old age, on friendship, on divination*, Lat.-Engl., ed. and transl. W. A. Falconer Cambridge (Mass.), Harvard University Press, 1923, 6, 17, p 27.

is in a natural state corresponding to his old age and in whom there is no violation of his natural and sensitive soul outside nature {507}: for in this case, old people can indeed be confused, but that is not the fault of natural old age, just as little as that of youth, since also young people can often be stupid and confused after an injury of the organs and their mental powers. We will find this often confirmed in the case of old people. For there is nothing that makes people despair more than in case of trying to understand languages and the power of geometry and arithmetic, because of the complicated subtleties of geometric and mathematical proofs, if they have not been taught in these areas from their youth. But if a man has a good teacher and if he learns carefully and with confidence, there are no difficulties in these fields of research.

I have even seen old people who learned Greek, Hebrew, and Arabic grammar at the first go and without difficulty, even though they had only bad teachers. And I am sure that everyone, if he just has a suitable teacher, is able to read and write Greek and Hebrew to the extent that he understands everything that the Latin-speaking saints and philosophers have said in their discourses in both theology and philosophy [from these languages] after one week, if he is only willing to put hard work into it. For it is easy to reach this stage, and yet it is worth a thousand gold marks to the wise, though it may not be easy to reproduce the sciences written in one language in another language or to speak about them in a generally understandable way. And even if this may not be what is considered necessary by your Glory, it is possible that after learning the languages, by the power of geometry and arithmetic – as a universal method so to say – nearly everything can be learned, as I will show in the progression of my writings.

For am I sure and willing to testify that I can teach every person willing to learn, within fifteen days, everything that is relevant to all the human and divine sciences as regards geometry, and even much more than that – namely, the usefulness of this science itself – than all mathematicians can learn within ten or twenty years. For they have the worst scientific methodology in this [science], which is why usually hardly anyone wants to deal with this science. I know, in fact, that there are no difficulties at all on the part of languages and the sciences, but on the part of teachers who either know nothing or do not want to teach it in a beneficial way, and on the part of the students who either do not work hard enough or fall into despair. All of this concerning the power of wisdom I have learned from my youth, and I have always learned carefully and continuously throughout my life (except for two years, when I had to allow myself relaxation and consolation in order to work better afterwards). And I would teach every person, young or old, within four years, if only they were enthusiastic and confident, and if only I had written a treatise beforehand, which I would explain orally. I am conveying this – it may be difficult due to the ignorance of the students – because no difficulties will remain if I explain it only orally; but, in addition, these things must be explained in other writings than my main writing, which your Majesty has sought.

Chapter 5

***Opus maius*, part I: On the four causes of error²⁸**

In order to illustrate my scripture [the *Opus maius*] which I have sent to you, it is necessary to show its intention, so that, if my writing is lost by any misfortune, your Blessedness may, by oral instruction, fully comprehend my principal intention. The persuasion which I am sending is divided into seven parts, which in turn are divided into different distinctions and chapters.

But nothing or very little can be made clear to anyone about the truth of wisdom without first excluding the four fundamental causes of human error by which every human being has been handicapped and every state of affairs corrupted from the beginning of the world. I am therefore pleased to eliminate, in the first part, those epidemics hostile to wisdom which consist in concealing each one's own ignorance by rejecting those things which we do not know and by unwise display of what we think we know. The other three causes are {508} the examples of a dubious and unworthy authority to which we refer as often as possible, the force of wrong customs binding us, and the opinion of the crowd that makes us insist on it.

These [four causes] are condemned by Scripture, denied by the saints, forbidden by canon law, and destroyed by philosophy; and all wise men have contradicted these four causes and always resisted them from the beginning of the world. For by these [causes] all sins have been introduced to life and to science, all utility has been excluded, and all men are engrossed by them and use them as excuses for their sins and errors. Even those men who are considered to be extremely wise are often blinded by these causes of ignorance. Therefore, I list in detail the opinions and experiences of the wise against these four kinds of poison. For otherwise the following parts would be treated in vain, because the conviction of the truth is impossible as long as these four causes prevail. This is how the first part is concluded with some further remarks.

Chapter 6

***Opus maius*, part II: On the relationship between philosophy and theology²⁹**

In the second part I show that there is a perfect wisdom contained in the Holy Scriptures, which must be explained by canon law and philosophy (by which I mean civil law and all human wisdom). For it is indeed the case that all useful, necessary, and dignified wisdom, whose author is God, is contained in the Scriptures. It is found there as if enclosed in a fist, and must be explained in more detail – as it were in the open

²⁸ Cf. Roger Bacon, *Opus maius, pars prima: Causae erroris*, in: *Opus maius*, 3 vols., ed. J.H. Bridges, London 1897-1900, repr. Frankfurt/Main, Minerva, 1964, vol. 3, pp. 1-35.

²⁹ Cf. Bacon, *Opus maius, pars secunda: Philosophiae cum Theologiae affinitas*, in: *Opus maius*, op. cit., vol. 3, pp. 36-79.

hand – by interpreting it by canon law and philosophy. Thus, the whole truth is there [in the Scriptures] as in a spring, compressed together and flowing through jutting streams into canon law and philosophy. There is in the root included that which runs through the delicacy of the branches, the gloss of the leaves, the beauty of the flowers, and the abundance of fruits and which is found in canon law and philosophy.

I show this by the saints, the peculiarity of the Scriptures themselves, by ecclesiastical law, and the power of philosophy, and also by the fact that the holy patriarchs and prophets have received all the wisdom from God since the beginning of the world. For Solomon had already completed everything before the unbelieving philosophers attained any level of wisdom. This must be given special consideration, because this confirms all that has come before and gives authority to all that follows. It is therefore not surprising that the philosophers spoke in a venerable manner about the heavenly bodies, the mysteries of nature and the arts, and even about God, Christ, the blessed Virgin, angels, demons, the resurrection of the bodies, the bliss of future life, eternal punishment, as well as about the confirmation of the commonwealth of believers and about other mysteries of divine and human wisdom, as I shall explain in detail in the five following parts. All this was revealed to the saints at the beginning of the world. It was confirmed and written down by them because of the [extraordinary] length of their lives. And the philosophers adopted from them everything they left us afterwards.

But this is not conveyed to us because we do not know Hebrew, Chaldean, Greek, and Arabic, which are the languages in which all wisdom is found: not only divine wisdom, as in the Old Testament, but also human wisdom as its counterpart. Because the wise have received the truth of God contained in the Scriptures since the beginning of the world and because it must be understood, expounded, weighed, defended, tested, and spread through philosophy, it has been given to them as well as the divine law. To prove this, I am recounting the whole of history from the beginning of the world through the different ages, so that I can find the time of all those who were famous for their wisdom. This way we can see which saints were endowed with all the wisdom, who was the Sybille, who were the seven famous wise men, who were the ‘lovers of wisdom’ after them, i.e. the philosophers; and what famous poets there were, so that it may be clearly seen that all wisdom was given to the saints by God before others appeared in this world, and that all of them adopted the principles of the sciences and the arts from the saints, as even the great Aristotle³⁰ – forced by the truth – admits. In this way I show {509} with the help of certain reasons that all wisdom is contained in the Holy Scriptures.

The first [reason] applies both to the persuasion that I am writing here and to the whole work that your Greatness has demanded. For I know and am certain that all truth

³⁰ Cf. Aristotle (Ps.), *Secretum Secretorum*, transl. R. Bacon, in: *Opera hactenus inedita Rogeri Baconi*, ed. R. Steele, vol. 5, Oxford, Clarendon Press, 1920, p. 64.

is contained in the wisdom of Scripture, and that all that is alien to it is necessarily profoundly wrong and void, and that it [the truth of Scripture] itself needs the power of canon law and philosophy for its apprehension and interpretation. I will call up all that I write now, and what I intend to write until the end of my life, to serve the wisdom of God.

I also claim that wisdom must be recognized in itself and in relation to the Church of God and the other [three] areas mentioned above. I explain that the power of philosophy can only be understood in terms of wisdom considered either absolute or relative. For I am sure that only that, which sacred science considers worthy of being used like a servant is useful and valuable in the area of philosophy: the rest is foolish and confused. Although the unbelieving philosophers have written much that is clearly evident and entirely necessary, which they have drawn from the roots of the saints, they have nevertheless been defeated by human weakness, because they were blind in their unbelief and the eyes of their minds were clouded by vain glory. They have published lengthy volumes in which much is contained that is false as well as true; and they have left behind both useful and useless things.

The second reason, why I am working as effectively as possible to show that all wisdom must be grasped by the Holy Scriptures, even if it needs ecclesiastical law and philosophy for our understanding, is that I want to convince the one who possesses all the fullness of power, so that the Vicar of the Savior may command that everything useful in the sciences and languages and everything necessary for the wisdom of God be made available for the study of wisdom. For there are innumerable things not present in the Church at the moment, which would be of the greatest benefit and glory to her, as will be clearly seen in the works which I am sending to you.

But the third reason moves me most strongly, because it concerns both the nature of study and the way of acquiring knowledge. Moreover, in the use of those who are in the Church of God, many things that are contrary to the wisdom of God have a great influence, while the latter (as well as other things that are most in agreement with it) are put aside and neglected. Yet it is precisely by wisdom, with the help of the sciences and useful facilities for life, that the whole Church of God, the commonwealth of believers, the conversion of unbelievers and the repulsion of those who cannot be converted must be directed in the right direction. What I can only touch on briefly here is explained more in detail in all the scriptures I am preparing. Above all, however, my intention should be clear after reading the seven fundamental parts of this work, because before these parts are put together, the truth about this whole subject cannot be made clear.

Chapter 7

*Opus maius, Part VII: Moralis philosophia*³¹

After the first two parts I move on to five sciences exclusively, although there are more than thirty basic areas of philosophy. But without these [five sciences] it is impossible to know about the other ones. They are all the more necessary because, although one of them is the noblest, the other four are also nobler [than all other sciences]. The fifth [science] is the foundation of all [other sciences] for the Latins, and so I present these [sciences] in my writing, keeping silent about the others, unless your Greatness tells me otherwise.

The last of these five sciences is indeed the master of all others: It is moral philosophy, which Aristotle also called «civil science». I divide [moral philosophy] into five basic parts:

The first [part] collects selected sayings of the philosophers about God, the Holy Trinity, the Lord Jesus Christ and the sublime Virgin, about the activities of the angels and the bad influences of the demons, about the resurrection of the bodies, the future bliss, purgatory and hell, and about the worship of God.

The second [part] distinguishes the roots of the public legislation of the commonwealth. This part contains all the civil law which is in use by the Latins and which is derived from it.

The third part deals with the basic rules for the behavior {510} of every individual.

The fourth [part] examines the existing religions and their number. And it examines in how far they are all false except one, which is true, and how this religion can be proved and recognized, and that the only true religion is based on Christian law.

The fifth part concerns the conviction of the observance of the established and proven law, whereby people are encouraged to love this law and abhor anything that is contrary to the law and virtues.

This great science is the goal of all human wisdom and uses the others as its maidservants, for all the other sciences exist only for moral philosophy and provide the truths and works of wisdom for it, which it uses in the five parts mentioned.

³¹ Cf. Roger Bacon, *Moralis philosophia*, ed. E. Massa, Padova, Editrice Antenore, 1953.

Chapter 8

*Opus maius, Part VI: scientia experimentalis*³²

The penultimate science is called *scientia experimentalis*. It is the master of all previous ones, for it surpasses all others by three great advantages:

The first advantage is that all other sciences, except this one, either only use arguments to prove their conclusion (as is the case with the speculative sciences), or use only general and imperfect experience. But only perfect experience allows the mind to rest in the light of truth, as is certainly the case and as is shown in this part [of my treatise]. Therefore, it was necessary that there should be a science that could confirm to us all the glorious truths of the other sciences. And it is this science of which I speak, and which is therefore called « experimental science ». I will show by means of examples, such as the rainbow and other [examples], the way in which this advantage is inherent to this science.

The second advantage consists in the highest truths which, although they can be named by the other sciences, cannot be treated by the other sciences, such as, for example: the prolongation of life by remedies for a poor lifestyle since childhood and a corrupt mixture caused by the parents who, for their part, have not observed the rules for a healthy conduct of life. For I show that such an extension [of life] beyond the usual length is possible, which can be taken to the limits determined by God, but which cannot be exceeded above this point. People age much faster and die much earlier than God has determined because of the neglect of a healthy and natural conduct of life. On the other hand, however, the art of medicine cannot provide and does not indicate any remedies, but only admits that these possibilities exist. That is why the *scientia experimentalis*, known only to the wisest, has invented remedies for delaying and alleviating the sufferings of old age once they have occurred. I will explain this most venerable example, and then others that are almost as venerable.

But the third of these advantages is most closely connected to this science itself, for it excels the two previously mentioned advantages and deals with everything that is not within the scope of the other sciences, apart from the fact that it needs the help of the other sciences in many areas.

In this way, this Mistress rules and gives orders to her servants, since she has the supreme power in the contemplation of things and its amazing works, as is magnificently demonstrated by many examples. For although astronomy may grant knowledge of future, present and past events according to its praiseworthy possibilities, this is even more true for this science, as Ptolemy says in his book *De*

³² Cf. Bacon, *Opus maius, pars sexta: De Scientia experimentalis*, in: *Opus maius*, op. cit., vol. 2, pp. 167-222.

*dispositione sphaerae*³³. Aristotle³⁴ and the more eminent philosophers also base their considerations on it, as we know from performing this science. In all these matters, however, the freedom of the will is preserved and necessity is not imposed on contingent things; nor does it promote anything that might be inappropriate for faith or philosophy, as is comprehensively shown by philosophers and saints in my distinction on the predictions [of Practical Astronomy]. Indeed, some works of this science consist in changing the world naturally, some in driving and directing the will without coercion, some in the amazement of wisdom, and others offer comfort to human life. This science uses all the other [sciences] {511} for moral science; especially so that they may produce for it sophisticated works and instruments that it can use: as the art of navigation orders a shipbuilder to make a ship, and the art of war orders a blacksmith to make chain mails and other kinds of armor. This science has the same rank regarding the other sciences: for it commands geometry to make for it a burning mirror that burns anything flammable, however stubborn and unbending it may be. And this applies not only to a short distance, but to any distance we want, as the author of the book *de speculis comburentibus*³⁵ teaches. Such burning mirrors could be made if your Glory would command so. This extraordinary miracle is therefore one of the sublimities that can be created by geometry. Experimental science commands geometry to do other things, and in a similar way it commands the other sciences to do other things as well, concerning all the wonderful and hidden things of nature and art.

Chapter 9

*Opus maius, part V: perspectiva*³⁶

This [science] is followed by perspective, according to the order of dignity and nature, but it is preceded by perspective in relation to science in itself and to us. This science is also necessary for the study of wisdom and for the world. Another science may be greater and more important, but none is more beautiful, as I show there at the beginning and as will be seen in the rest of the treatise. Because this science gives almost infinite pleasure and has immeasurable benefits, I am pleased to explain it in particular detail, especially because without it nothing of greatness can be known. For

³³ With this title Bacon refers to the first chapters of Ptolemy's *Almagest*, see: Ptolemy, *Almagest*, ed. and transl. G.J. Toomer, London, Duckworth, 1984.

³⁴ Cf. Aristotle, *Physica*, op. cit. II, 2, 194b1-8.

³⁵ Cf. Heiberg, J.L., and Wiedemann, E., «Ibn al Hautams Schrift über parabolische Brennspiegel», *Bibliotheca Mathematica*, 10 (1910), pp. 201-237; Bacon himself also wrote a treatise on burning mirrors, see: Roger Bacon, *Roger Bacon's Philosophy of Nature. A Critical Edition, with English Translation, Introduction, and Notes of De multiplicatione specierum and De speculis comburentibus*, ed. and transl. D.C. Lindberg, Oxford, Clarendon Press, 1983, pp. 271-400.

³⁶ Cf. Roger Bacon, *Roger Bacon and the Origins of Perspectiva in the Middle Ages. A Critical Edition and Translation of Bacon's Perspectiva with Introduction and Notes*, ed. D.C. Lindberg, Oxford, Clarendon Press, 1996.

it alone is the science of seeing, and a blind man cannot know anything about the world, because seeing shows us all differences between things, thus opening the way to know everything, as is also clear from experience and as Aristotle teaches in the first book of his *Metaphysics*³⁷.

The treatise on perspective, which I present to you, is divided into nine distinctions with their corresponding chapters, that contain only that which must please every wise man and which has to draw him to the love of philosophy. But I cannot explain the purpose of the various distinctions here and must therefore confine myself to the first [distinction], which deals with the parts of the soul; and to the second, in which the structure of the eye is discussed, because this science requires the power of geometry, which I have not yet explained in this letter. For everything [in *perspectiva*] requires the extensive use of lines, angles, and figurative representations, and this science extends to both divine and human wisdom, both absolute and relative. It also deals with great mysteries of nature and art that only the wisest can grasp. I give drawings and other rules for these things which cannot be contradicted. What I show in the drawings can also be converted to the physical world and the works of wisdom, if your Beatitude would initiate this.

Chapter 10

*Opus maius, part IV: About mathematics*³⁸

In a certain sense, mathematics is also needed for this science, which is why it is subordinate to it in the ranking of nature. But because, according to the opinion of all mathematicians, mathematics deals with other things which do not only extend to this science, and are even more important than the things dealt with in *perspectiva*, mathematics is dealt with before the science of perspective, but is immediately subordinate to it in the rank of worthiness, and comes later in our understanding.

Nevertheless, in the treatise which I am sending to you, I cannot separate the parts of mathematics from each other, nor can I give all the necessary information on them, because this can only be done in the main treatise which your Greatness has requested. Thus, it is sufficient at this point to address them briefly, because mathematics, in general view, comprises many sciences, even more than fourteen: for there are two kinds of geometry, speculative and practical, and similarly there are two kinds of geometry, arithmetic, astrology and music. And these are already eight, even if each of them still contains many sciences. But beyond all these there is one that is common to all {512} [i.e. mathematics]. That is why in this treatise it was necessary to speak in more detail about the power of mathematics than about the others. For its power is more far-

³⁷ Cf. Aristotle, *Metaphysics*, ed. W. D. Ross, Oxford, Clarendon Press, 1924, I, 1, 980a21-27.

³⁸ Cf. Bacon, *Opus maius, pars quarta*, in: *Opus maius*, op. cit., vol. 1, pp. 97-403.

reaching than that of the other sciences, since it is applied to everything and treats everything in a certain way.

On that account, although greater things can be dealt with in experimental science, there are more glorious things found here than in the other sciences. And there can be no question that I can confirm each of the sciences I enumerate here in another science, and that no [science] can be known without the others. For all the sciences are interconnected like the parts of a whole, and each of them benefits not only itself but also the rest. Nothing can be known without the merit of each one, because Tullius [Cicero] says in the second book of his *Tusculanae*: «No one can know even little until most or all is known.»³⁹ Therefore, each [science] depends on another and all support each other mutually. But mathematics stands out for a wider merit, because it has a wider scope of application. Therefore, in the first distinction I show how mathematics encompasses and explains everything.

And this consideration includes two major areas: one is the effective cause of the things of the world, the other concerns matter. For in the world and its parts two principles unite: agent and matter. Even if the agent (which is God) initially produced the fundamental parts of the world from nothing (like the heavens and the four elements), everything else is produced from the elements, that is, from matter. First, this is certainly shown by the explanation of the effective causes: how every multiplication of power⁴⁰ emanates from agents in this world and how everything multiplies its *species* and its power accordingly by lines, angles and figures. Be it in vision, the other senses, or in all the matter of the world. And not only is this influence necessary, but even more so the action that follows from it, so that we can see not only the multiplication of power emanating from agents – just as the light of the sun acts on everything – but also in what way it changes everything by means of its light. I speak of this action, because the same power, emanating from the sun, multiplies up to the stars and to the sense of touch, to clay and wax, melting the wax, hardening the clay, warming the sense of touch and decorating the stars with its brightness: But there is no difference from the side of the sun's influence, but from the side of the receiving matter. By means of these forces everything that is renewed in this world occurs, both in the upper and in the lower spheres. That is why nothing can be known without a knowledge of this influence and this action. But these forces cannot be recognized unless they are illustrated for our understanding by lines, angles and figures. In my persuasive treatise I therefore depict all roots of this multiplication and action with its necessary branches, flowers, and fruits.

In the second distinction I summarize the rules for these [roots etc.], because the whole science of perspective follows these rules and nothing can be known about them,

³⁹ Cicero, *Tusculanarum Disputationum Libri Quinque*, ed. T.W. Dougan, Cambridge, Cambridge University Press, 1905, 2, 1, 1, p. 162.

⁴⁰ See on the theory of multiplication in Roger Bacon in more detail: Bacon, *Roger Bacon's Philosophy of Nature*, op. cit., pp. 1-271.

unless those things are recognized in the best possible manner which are indicated in that distinction by the power of geometry. Because of this, many believe that it is a part of *perspectiva* to give explanations for this multiplication and actions, but this is not true; for these are common to all senses (not only the sense of sight) and to all things in the world, as I show by clear evidence for both the heavenly and the earthly spheres.

In the third distinction I apply these laws of multiplication to the phenomena of this world, citing famous examples, such as the illumination of the stars by the sun and all the projections of the forces within them, which are considered by astronomers. And I explain how the opinion of the philosophers who have argued that the world is a single continuous body and that heaven is of a fiery nature can be discarded beautifully – a view sometimes held by Platonists and the saints, which must nevertheless be refuted also by other paths in this matter.

Thereupon {513} are examined the compositions of all places of the world, because this is an important foundation for recognizing the things of this world. For they differ according to the diversity of the places, as is clearly evident from the diversity of the regions. And this consideration is also extended to the place of Paradise. For even if the multitude of theologians think that they have already shown the location of Paradise, there are considerable doubts about it. The reasons [for these doubts] are the aforementioned multiplications [of the sun's rays] and the eccentricity of the sun. Then I will transcend to the diversity of things in different places, which results from the influence of the celestial bodies. There I will first show, in general terms, the way in which the different compositions are produced in everything; not only in everything separate from man, but really in everything that exists: not only in the composition of men, but also in their customs, arts, and occupations, from which can be recognized the great roots on which the astronomers base their predictions.

Afterwards I come in particular to the causes for the flood and the low tide of the sea, which I explain by the rectangular and oblique incidence of rays. Because this is considered to be extremely difficult, and because no reason can be given by the crowd that is connected to the laws of multiplication, I will particularly deepen this famous example. Lastly these multiplications will be related to another field of research in order to achieve health and prevent disease. It will also be considered what is to be said about divination – for a certain truth cannot be denied despite the many falsehoods practiced by magicians and unbelievers.

The fourth distinction deals with matter and what actually follows from it, so that all this can be explained by the power of geometry and so that even greater things than before can be explained here. For the whole mass [of students and teachers] is seriously mistaken in assuming that there is numerically one matter in all spiritual and physical things, so that the same matter is in me, an ass, a stone, in heaven, in an angel and similarly in all other individual things. But nothing is so wrong that it is not nevertheless celebrated by the crowd, because the multitude is profoundly wrong in itself, as can be sufficiently taught to the whole world by natural and metaphysical

reasons. But I leave all these reasons aside here, because I only want to advance at this point by geometric lines. Yet the falseness in this leads to a falsity in the complete comprehension of things, because [by this false view] it is impossible to understand how the things of this world are separated. If this false view is adopted, the active powers and reasonable causes cannot be recognized. And neither the origin of created things nor the way in which they emerge from matter can be indicated. For if there is a principal error, the result is an error in the things that arise from the principles, as Aristotle says in the first book of *De caelo*⁴¹. As a consequence, the whole natural philosophy will be destroyed for the crowd by this wrong assumption, and there will be no remedy for ignorance as long as this assumption remains.

I cite three proofs from geometry as an explanation. The philosophers before Aristotle claimed that the world is a continuous body, as has been mentioned before, and this assumption results from the supposition of the unity of matter. This is why I explain this not by rejecting what has been rejected before, but by pointing out the false geometric representations, which I was able to resolve extremely successfully at this point, and of which I was also able to show how they must be corrected.

Because the position of Democritus and Leucippus, who claimed that everything consists of indivisible atoms, confused Aristotle very much and still confuses the natural philosophers by their sophistry, I also completely destroy their view by the power of geometry. But since the arrangement of geometric bodies is a passion of matter, and since both theologians and philosophers carefully examine the geometric figure of the heavens and the fundamental areas of the world, and since this consideration is quite beautiful, I show all that is necessary at this point. Not only do I explain the truth of the arrangement of the geometric bodies, but I also reject the Platonists' false views on this. This is a beautiful {514} contemplation for every person who wants to know these glorious truths.

In connection with this arrangement of geometric bodies, I describe in a most wonderful way a miracle of the nature of water, which effectively shows that the same vessel can contain more liquid when it is in a lower place than when it is raised to a higher place, and therefore will contain more in a cellar than on a terrace.

I also extend the reflections on the unity and finiteness of the world, because no one who assumes several worlds or a single infinite world can, according to the views of Aristotle⁴² and Averroes⁴³, which they set out in the first book of *De caelo*, show that there is a single God. I am going into this in particular because time obeys the conditions of matter, whereas motion obeys time, because eternity is linked to time. But all this is not taken into account by the mass, because the crowd cannot give the reasons by

⁴¹ Aristotle, *De caelo*, op. cit., I, 5, 271b8-10.

⁴² *Ibid.*, I, 9, 279a30-36.

⁴³ Averroes, *Aristotelis De caelo, cum Averrois commentariis*, vol. 5, Venice, Venetiis apud Iunctas, 1562 [reprint Frankfurt/Main 1962], p. 68r-v.

geometrical proof. I will consider motion in more detail, because there is a great difficulty and a great benefit there, which I show by many beautiful graphic representations. Therefore, in this part, the roots of that great science called the «science of weights»⁴⁴ will be treated. Then I compare mathematics to the other sciences and the things of the world which it [mathematics] has made recognizable and which are necessary for theology, demonstrating many times through by the sayings of the saints the extent to which it is extremely useful for theology.

Because there are seven great roots by which mathematics has great influence on the knowledge of divine wisdom, I show them in individual chapters where some great difficulties exist – not because of the matter itself, but because mathematics is unknown to the multitude. The greatest difficulty, however, arises in regard to the Passion of the Lord, namely on which calends and on which moon it was celebrated, although in this case I do not give any definitive opinion, since this cannot be done without your apostolic permission. Nevertheless, I cite some effective evidence against the view of the crowd, to whom mathematics is unknown.

However, although mathematics is incredibly useful for divine wisdom, as can be seen from what I have depicted, some influential *dicta* of the saints based on the predictions of future things stand in exaggerated contradiction to the prestige of mathematics. That is why I explain them and show that there is nothing to object to the kind of mathematics, which is a part of philosophy; but only to that kind of mathematics, which is a part of magic, which is why the saints have actually only negated this kind while praising true mathematics. For mathematics is twofold: one is superstitious, since it imposes a necessity on all things, and pretends to the free will a knowledge of future things. But this sort of mathematics has always been rejected by the saints and philosophers, as I clearly show. But the other sort of mathematics, which is part of philosophy, has been highly recommended by the wise. For though it may be identical in name to the mentioned above, it is completely different in its purpose.

Having seen this, I explain the power of mathematics in so far as it is useful to the Church, and I deal there with the faith which is related to the Church. I show in what way it can be strengthened by this science, explaining how astronomy describes all the fundamental religions to which the whole human race adheres from the beginning of the world to its end, which cannot be more than six. I explain how astronomers distinguish these religions, starting with the religion of the Hebrews and progressing to the sect of the Antichrist. I explain how they praise the Christian religion most, how they testify that Christ must have been born of a virgin, and how and when the religion of Mohammed will be destroyed, so that the Christians may have great joy. Similarly, the way for contemplating the time of the Antichrist is also prepared. For if the Church were to examine the prophecies of the Scriptures, the sayings of the saints and the

⁴⁴ Cf. Clagett, M., *The Science of Mechanics in the Middle Ages*, Madison, University of Wisconsin Press, 1959; Moody, E.A., Clagett, M., *The Medieval Science of Weights*, Madison, University of Wisconsin Press, 1952.

predictions of the Sybil, Merlin, and the other pagan prophets, and if the Church were to add to all this the considerations of mathematics and experimental science, it could undoubtedly take extremely useful precautions against the dangers of the Antichrist and his retinue. Because after all, an important consideration consists in why he will rise and {515} who he will be, which also applies to the further circumstances of his appearance. If the church would do what it actually is meant to do, God would, I believe, reveal himself more extensively, especially if a special consideration was ordered about it in the whole church.

For the prophecies have sometimes been pronounced with complete certainty and irrevocable judgment, but sometimes also without it, as is evident from the prophet Nathan⁴⁵, who later withdrew his statement about the building of the temple. And Isaiah⁴⁶ said of Ezekiel that his house was predestined to perish, and yet his life was destined to extend for another fifteen years; it was similar with the prophecy of Jonah⁴⁷ concerning the destruction of Nineveh, and there are many other examples of this kind. So quite a lot has been said about the Antichrist, what has happened by negligence of the Christians, and what would change if the Christians would do what actually would be their duty: namely to study the time of his appearance and to have great sciences at hand which they can use against him. Then his works could be refuted, as if they were not miracles. He could not pretend that he was like God, because all his manipulations are just products of nature, philosophy, and the great arts, although he will be able to do many things only with the help of demons. If the Church were taught the great sciences, then works comparable to those of the Antichrist could be created to her benefit. She could expose his falseness and push back his violent influence in many things, so that at least the worst confusion could be alleviated many times by him.

This is followed by an extremely important consideration about the falsity of the calendar: how it can be improved and how it can be corrected. In the beginning, the Church made a great and long-lasting effort in this matter, but this was finally abandoned because of difficulties, because the Church was busy in those days with defending itself against tyrants and heretics, and because astronomy was not yet certain at those times. But nowadays it is difficult to correct the calendar in all respects. Nevertheless, what is necessary to correct the calendar could be accomplished; but since this undertaking can only be carried out by the prelates, and since astronomy and computistics were not used among the prelates, it has been neglected until today. Nevertheless, after the correction of the extremely corrupt sacred Text in the copy currently in circulation, there is nothing in the Church of God that is in such urgent need of a remedy [as the calendar]. It is therefore the most stupid mistake and a real scandal that everyone proceeds here alone in his own ignorance, as all computists, astronomers and those who deal with computistics know.

⁴⁵ 2 Samuel 7, 1 f.

⁴⁶ 2 Kings 20, 1 f.

⁴⁷ Jonah 3, 1 f.

Having explained this, I apply the calculations of mathematics to the governance of the commonwealth, and at this point I find even greater and more pleasant things than in the previous passages. For here I touch the roots in order to recognize the lower things by means of the heavenly ones. In order to know all this, we must know the extent and shape of the world, e.g., where it is inhabitable and what climates and regions there are, so that we may know by which and in how many ways the regions differ from one another by the influences of the celestial bodies. And we must know how the same regions change at different hours, days, weeks, months, yearly quarters and years, and how different things in the same region change. That is why the nature of the planets and fixed stars is treated, namely how they influence this world and the individual things. Furthermore, the rules, tables, and illustrations necessary for this endeavor are given. In addition, a general procedure is presented for judging individual things. I will preserve a more detailed and specific approach for the main scripture that your Holiness has requested.

If man were to know no more about this world than that part of which this treatise treats, he would still have a very considerable knowledge of all the insights resulting from these principles. A consideration is then made which is even more important than that of the other useful works, so that those things that are beneficial to the commonwealth may be advanced and those things that are contrary to the commonwealth may be eliminated, from which the Antichrist and his followers will benefit. For by these works of experimental science and perspective he will divide the world as reward, unless the church refuses to this by considering {516} wisdom, and unless the wise use these works. For Moses, Solomon, Aristotle and many tyrants have attacked the world in this way, like Alexander the Great, who did not have 40,000 men at his disposal and yet dared to attack the whole world while retaining preponderance. But Aristotle was with him and gave him the world by the wisdom of mathematics and the other sciences.

I treat the considerations of astronomy, however, not only in regard to the changes of the whole world, but also in particular to the works of medicine: showing in what way it is necessary for the physician to know astronomy, because otherwise he would only treat his patients by chance and luck. I also refer to the most secret works of geometry, harmony, and music, which are of such great importance that it is difficult to express, and about which I therefore say very little.

Although we are left with two other fields of the application of mathematics, namely the conversion of the unbelievers and the repulsion of those who cannot be converted, I say about them only as much as may suffice at this time, because the roots for its applications are already indicated in the preceding distinctions.

Chapter 11

Opus maius, part III: On the languages of wisdom⁴⁸

There is another science that is easy for me to explain and that every child learns in his language, that is to say, grammar. Because the wisdom of the Latins is so much composed from other languages – since all of sacred Scripture and all philosophy is originally written in foreign languages – grammar, which is of the greatest benefit to the Latins, includes the orthography of other languages as well as other things which we know are related to grammar. I show this by means of eight great and beautiful reflections, so that it becomes obvious that the smaller things are of greater importance, as the apostle writes.⁴⁹ Indeed, it is clear to any wise man that here is a door here to the wisdom of philosophy, both in itself and in relation to the Church and the other areas mentioned above.

Of these [areas], two are particularly worthy of consideration, namely the correction of Scripture and the conversion of unbelievers. For I am proving without contradiction, by means of a universal proof, that the entire text [of the Bible] is wrong or at least dubious in the copy that is widely distributed; a doubt that arises in every wise man, just as fear affects a steadfast man. A special and particular proof will be possible to be presented here as soon as your wisdom commands it. But I am not doing this for myself alone, but even more so for another who has worked in this matter for over 30 years. He has changed the whole way of correction and therefore possesses all that is necessary for correcting the Bible. He could also complete this if he were only supported by books in foreign languages. For he would have long since given certain proofs [for a correct translation] if he had had a Hebrew and Greek Bible and books on the etymology of those languages, which are at least as numerous in their own country as Isidor⁵⁰ and Papias⁵¹ in our country, and which are even found among Christians in England, France and in many other places.

Therefore, this man would indicate the truth of the words and a sure exposition of the literary sense, so that everyone could then understand the Scriptures of his own accord and without any difficulty, and – if he would only make an effort – advance to the peculiarities and natural characteristics of the things in which the literary sense consists. For everything that is created, from the highest heavenly spheres to their outer limits, is contained in Scripture, according to genus and species as well as similarity and individual things, the knowledge of which determines the literary sense. In this way by appropriate adaptations and similarities adopted from the things the

⁴⁸ Bacon, *Opus maius, pars tertia: De utilitate grammaticae*, in: *Opus maius*, op. cit., vol. 1, pp. 66-96.

⁴⁹ Paulus, *Epistle to the Hebrews* 7, 7; *Epistle to the Romans* 9, 12.

⁵⁰ Isidore of Seville, *Isidori Hispalensis episcopi etymologiarum sive originum libri XX*, ed. W.M. Lindsay, Oxford, Clarendon Press, 1911.

⁵¹ Papias *Vocabulista, Papias vocabulista. Elementarium doctrinae erudimentum*, ed. B. Mombricio, Venice, 1496 [reprint Torino, Bottega d'Erasmus, 1966].

spiritual sense can be extracted. For this is peculiar to Scripture and is therefore also presented by the saints and sages, so that all the wisdom of philosophy can be grasped in the interpretation of the wisdom of God. And what that man lacks, can be adequately provided in this matter also by others with your help and at your command.

Chapter 12

Concluding remarks

Not only can this boy help your Holiness, who is occupied by so much else, with regard to the work sent by me {517}, if it pleases you, but moreover the announcements contained in this letter open the way to the understanding of my treatise. Furthermore, [this letter] also provides guidance for the correct reading of [my treatise]. However, if your Glory should have the time, it would be better to read the whole work according to its order, because the previous parts in the order of knowledge prepare for the following. However, because the excessive multiplicity of commitments will distract the mind of your bliss, and because equality is the mother of satiety, your wisdom may be tempted to prefer any of the seven parts and, by the perceived intention of the first parts, move on to the following.

The first and last parts [of the treatise] are of the same kind, since they both deal with moral issues contained in the first part, so it is easy to move from the first to the following parts. For in the first, second, third, and last parts there is almost no difficulty; but in many places [of the other parts] a variety of other things are dealt with, so there may be a lot of difficulty if one wants to complete the whole treatise sufficiently. Nevertheless, they can be easily understood, even if it is difficult to apply the numbers [of mathematics] to the things contained in Scripture. This is especially true when calculating the size and height of the celestial bodies as well as the stars and the elements of the world. Nevertheless, anyone can grasp without difficulty what I am about to present. This is true of many other things, both the practical applications of mathematics and the experimental sciences, since the works of nature and art require sophisticated and secret things which can be easily understood with my writing.

Even though there may be many difficulties in the application of mathematics to the things of the world as well as in perspective and in some other places in the way of proving things (at least for those who know nothing of geometry), their truths are nevertheless in themselves easy to understand. It does take a certain amount of effort for them, but it is extremely gratifying for the reader.

The young man [John], on the other hand, knows what belongs to geometry in itself not only through books but also by his heart. For if he could apply it to things and sciences as well as he knows it theoretically in the right way, he would be sufficient for himself and for all others, because this [geometry] is the way to know everything, as the sequence of the treatise makes clear.

It is inevitable, however, that the whole work, right down to the principle work [*scriptum principale*] that your Sublimity demands, will have its difficulties, because here I am only discussing the main idea and the general concern, which is incomplete and almost in vain. But every beginning has to be this way, as Aristotle⁵² and Seneca⁵³ say: Because the way leads from the confused to the differentiated, from the general to the individual, from the incomplete to the completed, and from the parts to the whole.

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⁵² Aristotle, *Physica*, op. cit., I, 1, 184a21-b14.

⁵³ Seneca, *Ad Lucilium epistulae morales*, op. cit., 14, 89, 1.