Fascination and Action at a Distance in Francis Bacon

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Abstract

Throughout his writings, Francis Bacon shows a great interest in the power of the imagination, both on other minds and on other bodies, a crucial part of natural magic. Convinced of the overall value of magic, Bacon nevertheless takes issue with the corrupt state into which he saw this discipline as having descended, overrun with false theories and invented stories. Bacon’s reform of experimental natural philosophy includes a naturalisation of magic, and this can be best illustrated when we look at his conception of fascination. In this paper, I show that the characteristics of this naturalisation are: (1) the definition of the object of study and the classification of phenomena; (2) the use of models and analogical thinking when the topic under study is difficult to observe; (3) the introduction of measurements and quantification of natural phenomena; (4) the need for replicability and diversification of experiments; and (5) the rejection of explanations in terms of occult qualities and their replacement with explanations in terms of the motion(s) of the spiritual matter emitted from the active body, which is impressed on the motion of the spiritual matter of the passive body.

Keywords

Francis Bacon – action at a distance – fascination – imagination – spirits

1 Introduction

For Francis Bacon, the most elevated discipline of natural philosophy is natural magic. Based on a deeper knowledge of nature than the other sciences, magic is able to produce a wider range of transformations and, more importantly,
to create new things, things that would otherwise never appear in nature. This conception of magic has led to a heated debate among Bacon scholars regarding the influence of, and his attitude towards, Renaissance magic. While initially Bacon's natural philosophy was seen as a reaction to the tradition of magic, later studies showed that his aim was not to replace Renaissance magic with his (modern) science, but to cleanse magic of the errors that had accrued to it, and at the same time to incorporate theoretical and methodological aspects of magic into his philosophy.\(^1\) However, even though scholars agreed upon the important role played by the magical tradition in Bacon's experimental philosophy, there is still no examination of the last of the ten centuries that constitute the *Sylva sylvarum*, the place where Bacon deals with what, for him, is the core of magical beliefs, namely fascination and action at a distance. Bacon's aim here, and in his philosophy more generally, is "to separate from superstitious and magical arts and observations, any thing that is clear and pure natural."\(^2\) This separation includes not only the standard distinction between natural and demonic magic, but also, more importantly, the one between what is possible, according to Bacon, and what is a mere invention of the mind. As for the latter, many astonishing and bizarre stories circulated at the time; showing that these are simple inventions would be, according to Bacon, of great use for the advancement of human knowledge.\(^3\)

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1. For the earlier claim, see Paolo Rossi, *Francis Bacon: From Magic to Science* (Chicago, IL, 1987; first published in Italian as *Francesco Bacone: dalla magia alla scienza* [Bari, 1957]); for the later claim, see Sophie Weeks, “Francis Bacon’s Science of Magic” (PhD diss., University of Leeds, 2007); and Doina-Cristina Rusu, “From Natural History to Natural Magic: Francis Bacon’s *Sylva sylvarum*” (PhD diss., Radboud University Nijmegen and University of Bucharest, 2013). Lately, scholars have started to analyse the influence of this tradition on Bacon’s work, not only at a general level regarding the aims of magic, but also at the level of methodology and individual experiments and theories, emphasising both the similarities and Bacon’s innovative approach; see Dana Jalobeanu, “Bacon’s Apples: A Case Study in Baconian Experimentation,” in *Francis Bacon on Motion and Power*, ed. Guido Giglioni, James Lancaster, Sorana Corneanu and Dana Jalobeanu (Dordrecht, 2016), 83–113; Doina-Cristina Rusu, “Rethinking *Sylva Sylvarum*: Francis Bacon’s Use of Giambattista Della Porta’s *Magia Naturalis,*” *Perspectives on Science*, 25 (2017), 1–35. For the fate of magic in the seventeenth century, and why Bacon – at the beginning of the century – could still call his main operative science ‘magic’, while the term became synonymous with witchcraft by the end of the century, see John Henry, “The Fragmentation of Renaissance Occultism and the Decline of Magic,” *History of Science*, 46 (2008), 1–48.


3. Cleansing magic of invented stories does not mean, as Koen Vermeir argued, that Bacon was reluctant to admit that the imagination can work upon other bodies; see Koen Vermeir,
It is not surprising that Bacon wants to distinguish his own natural magic from demonic magic and superstition; several other authors before him have done the same. Nor is there any surprise in the fact that Bacon presents his natural magic as the revival of Persian magic – the power to transform nature based on a thorough knowledge of its secrets; Marsilio Ficino, Cornelius Agrippa, Giordano Bruno, and Giambattista della Porta, to name a few, had done the same. What is specific to Bacon’s approach is what I call the ‘naturalisation’ of magical phenomena, in other words, the inclusion of magic into an experimental programme, where theories can be tested, phenomena isolated, measured, and compared, and new experiments designed to produce new knowledge. Similarly, if the phenomena related to fascination and action at the distance are natural, then they should be submitted to the same trials as the rest of natural phenomena.

My claim is that this naturalisation consists in several steps, which can be identified in the last century of the *Sylva sylvarum*. The characteristics of this naturalisation are: (1) the definition of the object of study and the classification of phenomena; (2) the use of models and analogical thinking when the topic under study is difficult to observe; (3) the introduction of measurements and quantification of natural phenomena; (4) the need for replicability and diversification of experiments; and (5) the rejection of explanations in terms of occult qualities and their replacement with explanations in terms of the motion(s) of the spiritual matter emitted from the active body, which is impressed on the motion of the spiritual matter of the passive body. The examples Bacon uses to illustrate his claims are – for the most part – commonplace in the tradition


of magic, many of them with roots in Pliny’s *Natural History*, and with reference made to them in Marsilio Ficino, Cornelius Agrippa, Girolamo Cardano, or Giordano Bruno. What is particular to Bacon is the methodological framework in which these examples are embedded. All the characteristics of naturalisation mentioned above are integral to Bacon’s own approach to this part of natural magic, and are in accordance with Bacon’s general programme for the reformation of natural philosophy.5

In several places across his writings, Bacon describes action at a distance and fascination to be the most complex aspects of magic, because of the subtlety of such phenomena. Fascination, for Bacon, is the power of imagination to produce changes upon other bodies.6 That imagination was assigned various powers was a commonplace in Renaissance philosophy, and its manifestations ranged from the evil eye – making someone sick by transmitting infected visual rays – to reading minds, altering people’s thoughts, and inducing certain passions and feelings within other humans and animals. In the scholastic and Renaissance traditions, this transmission was understood as taking place at a distance, in the sense that the two bodies were not in contact with one another. Whatever it was – this entity that travelled from the active person to the passive person – it had to fly through the air or some other medium. The existence of this type of action at a distance could not be denied, since vision, sounds and odours, or magnetic attraction worked in this way. In fact, it was precisely because of these demonstrable cases that certain other phenomena – someone suddenly falling sick, for example – was easily explained by action at a distance.7 During the Renaissance, another model of action at a distance

5 It has been argued that the *Sylva sylvarum* was probably not meant for publication, at least not in this form. However, even if the *Sylva* is a notebook, and even if most of the examples contained within it are taken from other authors, it is clear that the information is very much worked out and digested through Bacon’s own theoretical assumptions and experimental results. On the status of the *Sylva*, see Doina-Cristina Rusu and Christoph Lüthy, “Extracts from a Paper Laboratory: The Nature of Francis Bacon’s Sylva Sylvarum,” Intellectual History Review, 27 (2017), 171–202; on Bacon’s attitude towards authority and the use of sources, see Silvia Manzo, “Probability, Certainty, and Facts in Francis Bacon’s Natural Histories: A Double Attitude towards Skepticism,” in *Skepticism in the Modern Age: Building on the Work of Richard Popkin*, eds. José Maia Neto, Gianni Paganini and John C. Laursen (Leiden, 2009), 123–138; on how Bacon’s practice conforms to the theoretical requirements in digesting the information taken from sources, see Doina-Cristina Rusu, “Ants, Spiders, and Bees: Francis Bacon and the Method of Natural Philosophy,” Journal of Early Modern Studies, 9 (2020), 27–51.

6 In the *Sylva*, he states that: “Fascination is the power and act of imagination intensive upon the body of another” (Bacon, *Sylva sylvarum*, intro to exp. 946, SEH II, 654).

7 For an early modern overview of action at a distance within the scholastic framework, see Francisco Suárez, *Disputationes metaphysicae*, Disputation 18, Section 8 (“Whether, in Order to Act, an Efficient Cause Must Be Conjoined with or Close to the Thing Acted Upon”), in
emerged, the Neoplatonic one, according to which the communication was done without any entity travelling between the two bodies. Within this theoretical framework, there seemed to be no limit to the kind of effect that could be produced at a distance by a powerful imagination, as attested by widespread stories of such effects. Bacon's goal is to show that if one subjects the power of the imagination to his experimental method, many of the stories that circulated at the time would be proven to be pure inventions. With the exception of divine miracles, that is, God's intervention in the world, everything created must make use of natural powers, and everything that is natural (as opposed to supranatural, not to artificial) can be analysed by the experimental method. His inclusion of fascination in an experimental programme is of relevance to the question of how action at a distance was conceived in the early modern period.

In what follows, I will first discuss Bacon's classification of the types of action at a distance, which will give us an idea of the place occupied by fascination in the general realm of action at a distance and the use of other types of transmissions as model for fascination (section 2). I will then turn to the experimental characteristics of Bacon's approach, the inclusion of measurements and the need for the replicability and diversification of experiments, emphasising the particular problematic issues of subjecting fascination to a scientific methodology (section 3). All these methodological aspects are common to Bacon's natural and experimental investigation of phenomena. In the next section, I will illustrate how Bacon conceptualises the transmissions at a distance that emanate from the human mind and transform the surrounding bodies (section 4). Finally, I will elucidate Bacon's approach by situating him within the existing models of action at a distance (section 5).

2 Bacon's Classification of Transmissions at a Distance

At the very beginning of the final century of the *Sylva sylvarum*, Bacon establishes eight types of "emission or transmissions at a distance":

(1) Transmission of the thinner and more airy parts of bodies (as in odours and infections). This is the most corporeal type of transmission.

(2) Transmission or emission of those things called "spiritual species" (visibles and sounds). For this second type, the medium is very important, as they only work at a certain distance; and they are incorporeal.

(3) Emissions which cause attraction of certain bodies at a distance (electric bodies, such as amber; plants being attracted to water).

(4) Emission of spirits and immateriate powers and virtues, working by universal configuration and sympathy of the world (magnetic attraction, gravity, tides, motion of rotation, etc.). They work through all mediums but only at determinate distances.

(5) Emission of spirits (operations of the spirits of the mind upon other spirits; two types: of affections and of imagination).

(6) Influxes of the heavenly bodies (heat and light).

(7) Operations of sympathy (what are called “super-inducing virtues” or “dispositions upon people”).

(8) Emissions of immateriate virtues (sympathies of the individuals), but this is very doubtful.

Before moving towards an analysis of the items of this classification, one clarification is needed: Bacon distinguishes between material and corporeal. Everything in the created world – with the exception of angels and human souls – is material. Material entities, on the other hand, can be corporeal (tangible, dense, heavy) or incorporeal (imperceptible by the senses, rare, light). Incorporeal entities are called “spiritual” or “pneumatic.” Odours and infections are thus more corporeal (1), while visibles and audibles are less corporeal (2), and the rest from this classification are even less corporeal. However, all of them are material, they only differ in their degree of subtlety or tangibility. Though the presence of the expression “immateriate powers and virtues,” might seem to contradict this, I would claim that Bacon uses this expression to help the reader understand what he refers to in this classification.8 In other instances, he makes it clear that the use of the term ‘immateriate’ does not reflect his own philosophical position by adding the qualifier “what they call immateriate virtues” (my emphasis). As we shall see, the rejection of the claim that what is transmitted is immaterial is at the centre of Bacon’s programme for the naturalisation of natural magic.

Returning to the above classification, in the final century of Sylva sylvarum Bacon does not discuss the influxes of heavenly bodies (6), and only mentions a few general characteristics of the spiritual species (2).9 As for attraction of

8 I take Bacon’s use of the pair ‘materiate’/’immateriate’ to be synonymous with ‘material’/’immaterial.’ According to the Oxford English Dictionary, Sylva sylvarum is the first English text to use the term ‘immateriate,’ and the definition offered is “not physical; incorporeal; synonymous with ‘immaterial,’” while ‘materiate’ denotes something concerned with material things, or something solid and dense.

9 Bacon dedicates 190 experiments in the Sylva sylvarum to the issue of sounds (experiments 101–290), and the same experiments are published posthumously as a standalone
certain bodies at the distance (3) and emissions working by universal configurations (4), they are defined only in this classification (though in more detail than some others), but not analysed any further. The last operation, the emission of ‘immateriate virtues’ based on the sympathy between individuals (8) is described in experiment 998, as very doubtful, using the commonplace example of the weapon salve.

While (2), (3), (4), (6) and (8) are either dismissed, treated as dubious or left unexplored, Bacon’s focus lies on the transmission of spirits in vapours and exhalations (1), the emission of spirits or immateriate virtues originating in the minds of men (5), and the emission of spirits working by sympathy and antipathy, in which these spirits are transmitted from other bodies to men (7). All these three types of transmission involve humans, either as the transmitter or the receptor, in other words either as agent or as patient.

For Bacon, there are two kinds of spirits within the human body, the non-living (spiritus mortualis) and the vital (spiritus vitalis). Both are a mixture of fire and air, the difference being that the first one is more airy and is scattered throughout the body, while the vital spirit is more fiery and more branched off, making it also more subtle and more active. The non-living spirit tries to consume and escape the tangible body, while the vital spirit preserves the body. Bacon treats the first type of spirits, the non-living, when he discusses vapours and exhalations (1). Not only is the non-living spirit more airy, which means it is also more corporeal (i.e., tangible), but it is sometimes emitted together with parts of tangible matter, and this makes it highly dangerous, as is the case

10 On the issue of magnetism in the discussion of action at a distance, see the papers by Sander and Garau in this special issue.


12 A short analysis on this classification, with cross-references to other writings where Bacon mentions these different transmissions, can be found in Mary B. Hesse, Forces and Fields: The Concept of Action at a Distance in the History of Physics (Mineola, NY, 1962), 91–97.

with the plague and certain odours that can kill. I will set aside this type of transmission, and turn to the more subtle transmissions, those related to the vital spirit and the power of imagination.14

It is important to understand how the more corporeal transmissions work for an understanding of the work of imagination, as Bacon often compares the transmission of vital spirits to the transmission of non-living spirits. Moreover, since the transmission of more corporeal entities is easier to observe, it is used as a model for how transmission works in general. This analogy is based on two theoretical assumptions. First, the entities (non-living and vital spirits) have a difference of degree, not of kind. Because of their fundamental appetites, spirits tend to unite with others similar to them, and once this happens, the structure of the spirit changes, they become more fiery, and thus they can perform more complex functions.15 Non-living spirits are less fiery and disconnected; vital spirits are more fiery and connected. This connection is responsible for the spirits’ ability to perform more functions, as for instance the operations of the mind. Secondly, given the similarity between the two entities that are transmitted, the process of transmission is also similar. Bacon says: “certainly, it is agreeable reason, that there are at least some light effluxions from spirit to spirit, when men are in presence one with another, as well as from body to body.”16 I take “from body to body” to refer to things like the plague, odours, but also sensible species, and in fact all the transmissions from the list, with the exceptions of (4) and (7). We will now turn to the characteristics of this type of transmission “from spirit to spirit.”

3 Introducing a Scientific Methodology in Magic

In the previous section, we have seen that Bacon’s methodology consists in introducing classifications so that the object under study is demarcated and separated from other similar topics. The determination of the object – in this

15 On the distinctions between the two types of spirits in the human body, see Doina-Cristina Rusu, “Same Spirit, Different Structure: Francis Bacon on Inanimate and Animat e Matter,” Early Science and Medicine, 23 (2018), 444–458. In a certain way, it would be more proper to call the individuals ‘living’ and ‘non-living’ based on whether the structure of their spirits is more or less complex, since spirits themselves only change their fieriness.
16 Bacon, Sylva sylvarum, exp. 941, SEH 11, 652.
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In the case of fascination—includes ‘purifying’ natural magic from fantastical conceits as well as from demonic magic, both of which bring much prejudice to the discipline, making it look either superficial or outright sinful. The first target of Bacon’s critique is the “school of Plato.” Under the influence of Pythagoras, Plato—Bacon states—conceives of the world as a living creature. This idea, furthered by Plato’s followers, was more and more developed and so appeared the theory of the anima mundi. This theory claims Bacon continues, that the world is one huge living creature and its parts are interconnected. Therefore, the sensations and affects in one part of the world-body are sent throughout and felt by the other parts of the whole body due to the unity and harmony of nature. The Neoplatonic tradition is, according to Bacon, more dangerous than witchcraft. The conjuring of evil spirits, on which witchcraft is based, is a sin. However, the work of demons in itself produces natural effects; while the same effects would require more time when produced by natural means, with the work of demons the effects are immediate and therein lies the only difference. Neoplatonism does not offend faith, Bacon continues, instead it precludes the advancement of sciences, by the simple fact that it is an invention of the mind. Even more dangerous is the fact that Neoplatonism is advocated by learned men, and not by some ordinary witches and wizards, the likes of whom are often either identified as charlatans or accused of demonic magic. While it is true that Bacon’s description of the Neoplatonic conception is a distortion, this is no doubt done with a clear intention: by exaggerating the characteristics of the Neoplatonic tradition, Bacon wants to make sure that he presents his

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17 For the description of the world as an animal possessing a body, a spirit, and a soul, see, for instance, Marsilio Ficino, Three Books on Life, transl. by Carol V. Kaske and John R. Clark (Tempe, AZ, 1998), 248–251 and 288–291. As the medical spirits which are the vehicle of the soul connect the body and the soul of a human being, the spirit of the world connects the material elemental world with the soul of the world. The spirit of the world is Ficino’s addition to the Neoplatonic conception of the soul of the world.

18 Thus, Bacon equates witchcraft with demonic or black magic. In the context of fascination and the power of the imagination upon other bodies, he concludes: “My own judgement however, is this: though it be admitted, that imagination has power, and further that ceremonies fortify and strengthen that power; and that they be used sincerely and intentionally for that purpose, and as a physical remedy, without any the least thought of inviting thereby the aid of spirits; they are nevertheless to be held unlawful, as opposing and disputing that divine sentence passed upon man for sin, ‘In the sweat of thy face shalt thou eat bread’ (Genesis III, 19). For magic of this kind proposes to attain those noble fruits which God ordained to be bought at the price of labour by a few and easy slothful observances” (De augmentis scientiarum, SEH IV, 401). However, Bacon also admits that not all the effects of witchcraft result from communication with demons; some of them, as for example flying, are in fact the effect of drugs upon the imagination of the witch and of possible witnesses.
own conception as one which is essentially opposed to the idea that there is
a spirit of the world, especially given that spirits play such a crucial role in his
philosophy.¹⁹ There are two main features in the fantastical theory of the spiri-
tus mundi as Bacon illustrates it, which he regards as highly problematic: one is
their claim that operations can be done irrespective of distance, and the other
is that operations can be done in the absence of matter, or even against matter:

So that by this [spiritus mundi] they did insinuate, that no distance of
place, nor want or indisposition of matter, could hinder magical opera-
tions; but that (for example) we might here in Europe have sense and
feeling of that which was done in China; and likewise we might work any
effect without and against matter [...].²⁰

The fact that the distance at which action at a distance can take place is limited
is relevant particularly because this is a necessary condition for the possibility
of introducing measurements in the study thereof. In the same way in which
the magnet is not able to attract the iron at just any distance, all the other types
of transmissions must also be limited and thus made susceptible to measure-
ment. This is the first step in Bacon's attempt to introduce quantification in
natural magic.²¹ Of course, this idea is based on the second one, that no trans-

¹⁹ For Bacon, as already mentioned, even stones and metals have spirits, though less subtle
than the spirits of plants and animals. This does not mean that these things are alive,
since they do not perform any functions of life (such as generation, the lowest function),
and Bacon emphasises this by calling their spirits 'mortualis', even though they do pos-
sess a certain degree of life. For Ficino, stones and metals also contain spirits, and they
would also generate if not inhibited by their gross matter (Ficino, Three Books, 256–257).
However, “these things live not so much by their own life as by the common life of the
universal whole itself” (Ibid., 288–289). In other words, for Ficino, the spirits of individu-
als possess life because they participate in the spirit of the world, which in turn is alive
because it is the vehicle or the instrument of the soul of the world. Differently from this,
Bacon's spirits are themselves alive, and there are no superior entities, such as the spirit
of the world or the soul of the world, to give life to spirits.

²⁰ Bacon, Sylva sylvarum, intro to exp. 901, SEH I I, 641.

²¹ On quantification in Bacon's natural philosophy, see Graham Rees, “Quantitative Rea-
soning in Francis Bacon's Natural Philosophy,” Nouvelles de la République des Lettres, 2
(1985), 27–48; idem, “Mathematics in Francis Bacon’s Natural Philosophy,” Revue interna-
tionale de philosophie, 159 (1986), 399–426; Silvia Manzo, “Experimentación, instrumentos
científicos y cuantificación en el método de Francis Bacon,” Manuscrito, 24 (2001),
49–84; Dana Jalobeanu, “The Marriage of Physics with Mathematics: Francis Bacon
on Measurement, Mathematics and the Construction of a Mathematical Physics,” in The
Language of Nature: Reassessing the Mathematization of Natural Philosophy in the 17th Century,
ed. Geoffrey Gorham, Benjamin Hill, Edward Slowik, and C. Kenneth Waters
(Minneapolis, MN, 2016), 51–80.
mission at a distance is done without something material. If there is something material that travels between the transmitter and the receptor, then the distance must be limited. But the conditions of action at a distance are not limited to these two, namely a threshold and materiality. Others must be added:

If there be any power in imagination, it is less credible that it should be so incorporeal and immateriate a virtue, as to work at great distances, or through all mediums, or upon all bodies; but that the distance must be competent, the medium not adverse, and the body apt and proportionate. Therefore if there be any operation upon bodies in absence by nature, it is like to be conveyed from man to man, as fame is [...].

In order for action at a distance to take place, the medium must not be adverse to the kind of transmission, and the passive body must be apt to receive the transmission. As for the distance, it is not only that it must not be too large, but it is also the case that most of these operations work only by presence. Even if, in some situations, it seems that presence is not necessary and that transmission might thus be done without any material entity, this is not the case. Fame, as audacity and confidence, binds the spirits, and one can become famous to people whom one never meets. But when this happens, it is because fame is transmitted through intermediaries, and thus each transmission still takes place in dependence upon presence.

Bacon’s methodology of cleansing does not stop at the theoretical level. The practical level is just as important and, in the particular case of natural magic, this is even more so, because the existent corpus is full of fables and invented stories, presented as experimental reports, as well as demonic interventions presented as natural effects. The experiments and recipes of the corpus are to be replicated, quantified, and further diversified. But both the replication and the invention of new experiments, even by diversifying the existing ones, are rather difficult when it comes to the work of imagination. Fascination must be distinguished from self-suggestion and special attention must be given to those experiments in which the same person is both the agent and the patient:

22 Bacon, *Sylva sylvarum*, exp. 950, SEH II, 657. Except for fame, Bacon gives in the same experiment the example of the work of witches, who are supposed to perform operations on people situated at a distance without being in their presence. Bacon states that if this works it is either because the witch works on the imagination of intermediaries until this fascination arrives at the desired person, or it happens indeed without any presence through the work of evil spirits. The witch being in possession of some objects belonging to the person to be hurt, Bacon adds, is not enough for the imagination of the witch to get in contact with the imagination of a person who is not present.
The problem there is, whether a man constantly and strongly believing that such a thing shall be, (as that such an one will love him, or that such an one will grant him his request, or that such an one shall recover a sickness, or the like,) it doth help any thing to the effecting of the thing itself. And here again we must warily distinguish; for it is not meant (as hath been partly said before) that it should help by making a man more stout, or more industrious; (in which kind constant belief doth much;) but merely by a secret operation, or binding, or changing the spirit of another: and in this it is hard (as we began to say) to make any new experiments; for I cannot command myself to believe what I will, and so no trial can be made. [...] The help therefore is, for a man to work by another, in whom he may create belief, and not by himself [...].

If someone wears an amulet that is supposed to give courage and that person becomes indeed more courageous, it is not because his imagination is bound by the secret virtues of the amulet, but simply because that person became more active and courageous thinking that the amulet would indeed make him more courageous.

The materialisation of the work of the imagination – namely, the idea that whatever is transmitted from the mind to the surrounding objects must be material, even though very subtle – makes it possible to include it in a natural philosophical enquiry. This enquiry includes classifications, definitions, and delimitations of the objects under study, the identification of false theories and unfruitful experiments, the use of models and analogical thinking, and the introduction of quantification and measurement. In the following sections, we will turn to how exactly fascination works for Bacon, and what are the ontological assumptions that underpin the explanation of such a process.

4 Imagination, Fascination, Transmission of Spirits

In the *De augmentis scientiarum*, Bacon defines fascination as follows:

Fascination is the power and act of imagination intensive upon the body of another (for of the power of imagination upon the body of the imagi-nant I have spoken above [i.e., when discussing medicine]); wherein the school of Paracelsus and the disciples of pretended natural magic have been so intemperate, that they have exalted the power and apprehension

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of the imagination to be much one with the power of miracle-working faith. Others, draw nearer to probability, looking with a clearer eye at the secret workings and impressions of things, the irradiations of the senses, the passage of contagion from body to body, the conveyance of magnetic virtues, have concluded that it is much more probable there should be impressions, conveyances, and communications from spirit to spirit (seeing that the spirit is above all other things both strenuous to act and tender to be acted on); whence have arisen these conceits (now become as it were popular) of the mastering spirit, of men unlucky and ill omened, of the glances of love, envy, and the like. [...] And here comes in crookedly and dangerously a palliation and defence of a great part of ceremonial magic.24

In the final century of Sylva, Bacon does not again define fascination. Instead, he defines imagination in the following way: “Imagination in this place I understand to be, the representation of an individual thought.”25 Even if imagination can refer to things from the past (memory) or present, the strongest is the belief in what will happen in the future. This is because imagining the future brings hope and – for Bacon – hope is the most powerful type of affection (together with envy, which is so powerful as to make others sick, i.e., to provoke the ‘evil eye’).26 The two definitions emphasise the same idea: fascination is the power of imagination upon another body or another mind, mind here being understood as the animal spirit.

In my opinion, the use of the term ‘representation’ in the Sylva is not accidental. In the first book of his De subtilitate, Girolamo Cardano defines the senses as representations: “For speech is a representation due to the imaging power of hearing; a picture, a sculpture are representations due to the imaging power of sight; and writing seems to exist through vision and hearing; but both writing and speech exist through the aid of the internal sense.”27 What I consider crucial in Cardano’s account of representation is that he does not refer to an image created in the mind, but to an external expression of that image, both based on the information received by the senses. He mentions speech (the act of speaking), pictures and sculptures, and writing; he connects the external

24 SEH IV, 400.
25 SEH II, 654.
26 In the Historia vitae et mortis, Bacon discusses how these two feelings affect the vital spirit; see OFB XII, 267.
27 Girolamo Cardano, De subtilitate, ed. and transl. John M. Forrester and John Henry (Tempe, AZ, 2013), 17. These representations are, for Cardano (as they are for Bacon also), material, though they constitute one example of subtlety.
representation of a sense-perception with the ‘imaging power’ of the senses. This is to say that, through representation, what is received from the senses is expressed back in the world: I see a landscape, I have the image in my mind, then I represent it on a canvas. Representations are thus external expressions of internal active imaging powers. In this context, we can understand what “the representation of an individual thought” means for Bacon. Imagination is the faculty that creates images and thoughts with the information coming from the senses, and it represents them to the mind.\footnote{Bacon, \textit{Sylva sylvarum}, SEH II, 654. In the \textit{De augmentis scientiarum}, analysing the effects of the mind upon the body, Bacon describes imagination as “a thought strongly fixed and exalted into a kind of faith” (SEH IV, 378). As a faculty of the material soul (identical with the vital spirit), imagination has more functions, from combining the information coming from the senses, to being the messenger between the reason and the will. In relation to fascination, Bacon focuses on imagination as belief or faith. On the identification of the produced corporeal soul with the vital spirit, see, for example, Silvia Manzo, \textit{Entre el atomismo y la alquimia: la teoría de la materia en Francis Bacon} (Buenos Aires, 2006).} Fascination, as the external counterpart of imagination, expresses those images and thoughts externally, namely on the bodies and minds of other people. It thus becomes clear why – while defining imagination as a ‘representation’ – it is, at the same time, an active power, which can have effects upon external bodies. When he says “in this place” in the definition of imagination, he refers to the context of action at a distance, in which case imagination is synonymous with fascination.\footnote{I would like to thank Christoph Lüthy for drawing my attention to the puzzling use of the term ‘representation’ in the context of the active powers of imagination.}

Following the tradition of magic, Bacon agrees that there are three main instances of the power of the imagination: upon one’s own body (including a foetus in the mother’s womb), upon ‘dead’ bodies (plants, stones, and metals, that is those bodies which contain non-living spirits), and upon the (vital) spirits of animals and men.\footnote{\textit{Sylva sylvarum}, exp. 945, SEH II, 654. Plants, for Bacon, are ‘dead’ bodies because they only contain non-living spirits, in charge of generation, nourishment, and death. Only animals and humans possess vital spirits, which are in charge of sensation and reasoning. Of course, since they possess spirits, even stones are alive, but because only animals and men have spirits performing more complex functions, they alone are the proper living beings.} As an example of the first, Bacon mentions the power of the mother’s imagination upon the foetus in her womb. Whatever the mother imagines, if this thought is very powerful, will be represented in the foetus. The spirits carrying the thought move through the body and affect the matter of the foetus, because this is in development and thus does not yet have a definite constitution. The last two instances, the operations upon dead bodies and the spirits of animals and men, deal with action at a distance \textit{per se} and the emission of spirits. The distinction between ‘dead
bodies’ and the ‘spirits of animals and men’ mirrors the distinction between the two types of spirits: non-living and vital, as the entities upon which imagination has the power to act. In the next section, we will explore the details of Bacon’s ontology that renders it possible for the imagination to act upon other bodies or other minds.

5 The Ontology of Fascination

In an article discussing action at a distance, Silvia Parigi argues that the early modern period saw the appearance of a new causal model, one which occupies a position in between the two ‘classical’ causal models. The first of these two was the (Neo)Platonic model of action at a distance \textit{per se}, in which the world was conceived as an animal, and causation could take place at any distance, without contact, as when our entire body is aware of the pain felt in one member. This model, according to Parigi, was used particularly in magic. The second model was the Aristotelian one, in which any communication between bodies was always conceived as taking place by contact and through a medium. This latter model, Parigi argues, was adopted by Descartes and other mechanists. The new, third causal model is a combination of the two. Bodies emanate effluvia up to a certain distance, and the limits of this distance represent their orbs of virtue.\footnote{For the term ‘effluvia’, see Silvia Parigi’s definition: “The term ‘effluvium’ means every kind of exhalation or emission produced by physical objects. It appears for the first time in Pliny the Elder’s \textit{Historia naturalis}, together with the words sympathy and antipathy; reemerges in the philosophical lexicon with Marsilio Ficino and Girolamo Fracastoro; and becomes a key concept of natural magic and natural philosophy in the sixteenth and seventeenth centuries” (Silvia Parigi, “Effluvia,” in \textit{Encyclopedia of Early Modern Philosophy and the Sciences}, ed. Dana Jalobeanu and Charles T. Wolfe [Cham, 2020], \url{https://doi.org/10.1007/978-3-319-20791-9_507-1}).} This is a communication by contact model, but what is different from both the Aristotelian and the Cartesian models is the kind of entity which is transmitted. Effluvia are neither species nor mechanical corpuscles. Parigi shows that Gassendi and Boyle adopt a ‘qualitative’ corpuscularianism in which the particles retain the physical characteristics and the chemical compositions of the body from which they emanate.\footnote{See Silvia Parigi, “Effluvia, Action at a Distance, and the Challenge of the Third Causal Model,” \textit{Studies in the Philosophy of Science}, 29 (2015), 351–368. Parigi identifies Fracastoro, and Sennert as the sources of this qualitative corpuscularianism.} Where can we place Bacon on the map of accounts of action at a distance? Is he closer to a qualitative approach or to a quantitative, mechanistic approach?
Bacon rejects the Neoplatonic model of action at a distance, as we have seen above, and he moreover adopts the orbs of virtue. For Bacon, each body emanates subtle material spirits into the surrounding medium, and these effluvia interact with the effluvia of other bodies whose orbs overlap with their own. In the case of humans, both the non-living and the vital spirits can travel outside the body and interact with other spirits or with the tangible matter, as is clear in the case of plague. However, plague is a case of the transmission of vapours, which means that the entity transmitted is in between pneumatic and tangible, and its efficacy consists in the presence of infested tangible particles.

But when we talk about fascination, how does this mechanism of transmission work? Is it closer to the qualitative approach described above or to the quantitative approach? First, Bacon makes it very clear that he rejects what for most scholastics would have been an occult quality, a quality which, unlike secondary qualities, cannot be reduced to the primary elemental qualities. The source of the occult qualities was believed to be the form of the thing, not the elementary matter. Explanations in term of occult qualities were used in magic to explain a large range of phenomena. Since he rejects substantial forms, Bacon could not adopt this type of explanation (as conceived by the scholastics and certain writers on magic, such as Cornelius Agrippa). What other authors would have explained by making use of the occult quality of a

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33 Through the use of spheres of activity, action at a distance – in Parigi’s well-chosen words – was not considered so embarrassing as the completely free action allowed by a Neoplatonic spirit (Parigi, “Effluvia, Action at a Distance,” 356). On Bacon’s orbs of virtue, see Dana Jalobeanu, “‘Borders’, ‘Leaps’ and ‘Orbs of Virtue’: A Contextual Reconstruction of Francis Bacon’s Extension-Related Concepts,” in Boundaries, Extents and Circulations: Space and Spatiality in Early Modern Philosophy, ed. Koen Vermeir and Jonathan Regier (Dordrecht, 2016), 229–254.

34 In the De sapientia veterum, SEH VI, 710, Bacon uses the analogy of a hairy body to illustrate the fact that all bodies emit rays into their surroundings: “The body of nature is most elegant and truly represented as covered with hair; in allusion to the rays which all objects emit; for rays are like hairs or bristles of nature; and there is scarcely anything which is not more or less radiant. This is very plainly seen in the power of vision, and not less so in all kinds of magnetic virtue, and in every effect which takes place at a distance. For whatever produces an effect at the distance may be truly said to emit rays.” See Rusu, “Deceiving the Senses.”


precious stone or of an amulet is explained by Bacon as a consent between the spirits in the two bodies:

There be many things that work upon the spirits of men by secret sympathy and antipathy: the virtues of precious stones, worn, have been anciently and generally received, and curiously assigned to work several effects. So much is true: that stones have in them fine spirits, as appearreth by their splendour; and therefore they may work by consent upon the spirits of men, to comfort and to exhilarate them.38

The power of stones and other amulets is limited to agitating, relaxing, and cheering the spirits. The relaxation of muscular contractions, for example, works in this way: when one wears rings with a seahorse tooth, or bands of the herb called green periwinkle tied about the leg, these herbs do not transmit any occult virtue. What they do transmit are spirits which work upon the spirits within the nerves, to make them strive less. This will lead to a relaxation of the tangible matter around the spirits and so eliminate the muscular contraction.39 Put differently, there is no ‘relaxing virtue’ in the seahorse tooth or in the periwinkle, as scholastic authors or natural magicians believed. By contrast, for Bacon, these substances transmit their spirits, and the human spirits adopt the same motion because of the consent between them. Or expressed in yet another way, because the spirits of the stones are fine, a relation of sympathy is established between them and the human spirits. It is on the basis of their sympathy or consent that spirits in the patient imitate the motion of the spirits in the agent. One might say that the example of muscular contraction is an easy one but, through the same mechanism, several other diseases can be cured, such as epilepsy, for example. This is because, according to Bacon, epilepsy is caused by the motion of spirits. Super-inducing other spirits with their particular motions will lead to the modification of the spirits in the passive body and will in this case help them to enjoy the state they are in so that they are not willing to leave the body (this desire being regarded by Bacon as the cause of an epilepsy crisis).40

According to Bacon, external entities can condensate and cool down spirits, or excite and agitate them. Of course, several changes are produced in the body as a consequence of these operations upon the spirits, but what I would like to emphasise is that these changes on the body are not the effect of inducing

38 Bacon, Sylva sylvarum, exp. 960, SEH II, 661.
39 Sylva sylvarum, exp. 964, SEH II, 662; exp. 968, SEH II, 663.
40 For the example of epilepsy, see Sylva sylvarum, exp. 966, SEH II, 662; exp. 978, SEH II, 665.
qualities or transferring qualities from one body to another. When spirits are transmitted and these new spirits enter into contact with the spirits of a passive body, they change the previous motion of spirits in the passive body, or sometimes they simply increase the quantity of spirits, which in turn will have an effect upon their motions and desires. The effects in the passive body are the result of this change of motion.

The same mechanism is in place when the active body acts through imagination:

We have set down also some few instances and directions, of the force of imagination upon beasts, birds, etc.; upon plants; and upon inanimate bodies: wherein you must still observe that your trials be upon subtle and light motions, and not the contrary; for you will sooner by imagination bind a bird from singing than from eating or flying [...].

With respect to animals, Bacon’s examples are horse races and cockfights. “For you may sooner by imagination quicken or slack a motion, than raise or cease it: as it is easier to make a dog go slower, than to make him stand still that he may not run.” As for plants, imagination also works better upon the ‘lighter motions’: the sudden fading or revival of plants, their bending one way or another, or their closing and opening. For inanimate things Bacon advises to try the force of imagination “upon the staying the working of beer when the barm is put in; or upon the coming of butter or cheese, after the churning, or the rennet be put in.”

41 For example, the brain of certain animals, such as apes, represents a healthy food for humans because they contain a great quantity of spirits, since apes are rather intelligent animals, the closest to humans. But neither in this case, nor in the case of other animals, is there anything like a virtue or quality being transmitted: “The writers of natural magic do attribute much to the virtues that come from parts of living creatures; so as they be taken from them, the creature remaining still alive: as is the creature still living did infuse some immaterial virtue and vigour into the part severed. So much might be true; that any part taken from a living creature newly slain, may be of greater force than if it were taken from the like creature dying of itself, because it is fuller of spirits” (Sylva sylvarum, exp. 994, SEH II, 669). For Bacon, natural death occurs when the vital spirits leave the body, and this does not happen suddenly. If death occurs naturally, then the dead body has a low quantity of spirits, but if death is sudden, then the majority of spirits did not leave the body yet, and its parts are full of spirits. In Bacon’s explanation of why parts of living animals are stronger, the accent is put on the quantity of spirits, and not on the quality of the given animal which would be transmitted.

42 Bacon, Sylva sylvarum, exp. 989, SEH II, 668.

43 Bacon, Sylva sylvarum, exp. 990, SEH II, 668; exp. 991, SEH II, 669; and exp. 992, SEH II, 669. As we can see, for Bacon all these transmissions are similar, irrespective of whether the patient possesses a faculty of imagination or not.
The main idea conveyed in these examples is that it is easier to modify a light motion than a stronger one, just as it is easier to change an already existing motion than to create one that is completely new. We can understand this if we look at Bacon’s ontology. The motions of spirits, in both the active and the passive bodies, are caused by their desire to satisfy the basic appetites of matter. Singing is caused by the appetite of enjoying one’s nature, while eating is caused by the appetite of self-preservation. The latter is the strongest of all appetites, and putting a stop to the motions leading to the satisfaction of this appetite would mean to go against the most fundamental law of nature, that of self-preservation.\textsuperscript{44} This is why it is easier to prevent a bird from singing than from eating.

But the fact that some motions are more easily changed than others does not explain how it is possible to change the motions of the passive body in the first place. The answer is again to be found in the appetites and their simple motions. Bodies have an appetite “for multiplying themselves and propagating their form, and for imposing themselves upon other bodies which are adapted and susceptible to this.”\textsuperscript{45} More precisely, there is a motion of excitation, which explains how bodies impose their motion on other bodies:

Bodies do not just assimilate in a body or concrete state as, for instance, when flame generates flame, or flesh flesh, but also in the case of a simple nature or virtue, as when heat begets heat, and a loadstone (which is [not] itself changed) bestows verticity on iron. Now we call this diffusive or transitive force \textit{motion of excitation} because it does not so much subdue bodies (which is what assimilation does) as appears to insinuate itself into the other body and excite within it a nature to which it previously had some inclination, but one hidden and dormant.\textsuperscript{46}

\textsuperscript{44} On the continuous fight of appetites, see Guido Giglioni, “Mastering the Appetites of Matter: Francis Bacon’s \textit{Sylva Sylvarum},” in \textit{The Body as Object and Instrument of Knowledge: Embodied Empiricism in Early Modern Science}, ed. Charles T. Wolfe and Ofer Gal (2010), 149–167. Giglioni focuses on the conflicts between appetites within the same body, but the same kinds of conflict are at work in the interaction between different bodies. In the \textit{Abecedarium novum naturae}, Bacon ascribes motions to each of the four fundamental appetites, primary desires existing in each particle of matter. For the classifications and definition of appetites, simple and compound motion, see \textit{Abecedarium novum naturae} in OFB XII, 190–211. On how the simple natures can be reduced to the simple motions, see Rusu, “From Natural History to Natural Magic,” 192–202. On motions in Bacon more generally, see Manzo, \textit{Entre el atomismo y la alquimia}; and eadem, “Francis Bacon y la concepción aristotélica del movimiento en los siglos XVI y XVII,” \textit{Revista de filosofía}, 29 (2004), 77–97.

\textsuperscript{45} Bacon, \textit{Abecedarium novum naturae}, OFB XIII, 197.

\textsuperscript{46} Ibid, 199.
We have encountered earlier the idea that the passive body must be “apt and proportionate” in order for the emission of spirits to have any effect. In the *Abecedarium*, Bacon qualifies this even more: only those motions towards which the body is inclined can be brought into existence by the active body. Regarding the power of the imagination upon other minds, Bacon dedicated a great number of experiments from the *Sylva* to offer advice on how to strengthen the imagination of the patient, because a strong imagination is easier to command.47 This is why, Bacon continues, magicians use in particular boys and young people, because their “spirits easiest take belief and imagination.”48

In other parts of the *Sylva*, he mentions also women and uneducated people, suggesting the same thing: that their imaginations can more easily subjugate reason than be governed by reason. An imagination which is stronger and easier to manipulate is the equivalent of the lighter motions in birds, animals, or the inanimate bodies. A strong imagination is very active, but given that its motions are not governed by reason, they can easily be changed through external manipulation. At the same time, once changed, these thoughts can become very powerful, and their representations can be transmitted to other bodies.49

We can now draw some conclusions regarding Bacon’s model of interaction between bodies situated at a distance from one another: it is neither the quantitative nor the qualitative one. By contrast with the qualitative model, Bacon’s spirits do not transmit the chemical composition nor the physical

47 Dana Jalobeanu has suggested that the experiments on fascination from the *Sylva* function as the operation opposite to the eradication of the idols of the mind (Dana Jalobeanu, “Bacon’s Brotherhood and Its Classical Sources: Producing and Communicating Knowledge in the Project of Great Instauration,” in *Philosophies of Technology: Francis Bacon and His Contemporaries*, 2 vols., ed. Claus Zittel, Gisela Engel, Romano Nanni and Nicole C. Karafyllis (Leiden, 2008), 1: 197–230). And indeed, while the *Novum organum* offers solutions to keep the imagination in check, so that it does not interfere with the process of reasoning, the experiments regarding the strengthening of the imagination seem to do the opposite: a strong imagination will overpower reason and impede the process of thinking. It would be interesting to find out whether Bacon thought it ethical to encourage people to strengthen their imagination, given that this would affect their use of reason, and make them easily manipulable by others. It is clear that Bacon does think it might be useful to command people’s imaginations under certain conditions (such as in his example with curing a person by using his servant’s imagination, *Sylva sylvarum*, exp. 952, SEH II, 658), but he also concedes that the introduction of new doctrines involves tyranny “over the understandings and beliefs of men” (*Sylva sylvarum*, exp. 1000, SEH II, 672).

48 Bacon, *Sylva sylvarum* exp. 947, SEH II, 656.

49 Bacon suggests that thoughts resulting from belief are stronger than those resulting from reasoning. Moreover, he designs experiments to fix thoughts on people with strong imaginations when one needs those imaginations to be operative; see, in particular, *Sylva sylvarum*, exp. 953–955, SEH II, 658–659.
characteristics of the body that emits them. Contrary to what happens in the quantitative mechanistic model, the spirits are not differentiated in terms of size and shape and, most importantly, their motion is not mere local motion. It would be accurate to say that spirits do not carry anything with them, but that they are simply in a certain specific motion, which in turn depends on the appetite they try to satisfy. Far from being mechanical local motion, Bacon’s motions are qualitatively distinct from one another, and this is why a variety of bodies and phenomena can arise from their combinations.

In a nutshell, Bacon’s model of action at a distance is a hybrid model, which combines features of both the qualitative and the quantitative: the entity transmitted is matter in motion, as it is for the mechanists, but the motions are qualitatively, and not quantitatively, distinct from one another (which would make the model closer to the qualitative one). In addition, bodies have orbs of virtues, which limit the distance at which they can interact with other bodies. The entity transmitted from the active body is, as we have seen, the non-living or vital spirits of the body, bringing with them a specific kind of motion, which will be taken over by the passive body, if the latter is weak enough as to give up its previous motion, and if it has a predisposition towards this new kind of motion.

There is one more clarification needed in order to better understand where we can position Bacon with respect to his contemporaries. It has been argued that Renaissance magic is either ‘intersubjective’, which is to say it “presupposes an identity or analogy of pneumatic structure between the manipulator and the patient,” or that it is ‘extrasubjective’, when it is directed “toward beings of a lower order, or at least, [when it] does not stem from pneumatic interaction between two subjects.”50 In brief, the distinction consists in whether

50 Ioan Petru Couliano, *Eros and Magic in the Renaissance* (Chicago, IL, 1984), 109–110: (inter)subjective magic depends on an “analogical structure” between the manipulator and the patient, i.e., their pneumatic spirit. It can only be applied to humans and animals, who have imagination: “the principles of subjective and intersubjective magic do not function in the lowest realms of nature [i.e., plants and inanimate substances] because these are not capable of producing phantasms and therefore cannot be directly influenced by the imagination of the manipulator.” For Couliano, magic is by definition transitive, in the sense that there is always a manipulator (the agent or the transmitter) and always a patient (the receiver). He thus modifies the distinction proposed by D.P. Walker between subjective and transmissive magic, in which the former designates a situation in which the manipulator works upon himself, and the latter one in which he works upon his surroundings (see Walker, *Spiritual and Demonic Magic*). For Couliano, intersubjective magic includes intrasubjective magic. The latter (intrasubjective) designates the identity of the manipulator and the patient, including the cases of the mother working on the embryo; see Couliano, *Eros and Magic*, 109.
or not the patient can create phantasms – animals and men can; inanimate beings and plants cannot. Bacon does mention that imagination works upon dead bodies or upon other spirits or minds, and he does define fascination as the external representation of a thought. However, for Bacon, this distinction does no more than catalogue the entities upon which the imagination can work; it does not presuppose any difference in the mechanism of transmission or reception. Whether or not the receptor can form images is not relevant for Bacon; what is relevant is that the spirits carry with them motions which are generated on the passive body. Of course, the transmission of thoughts is a more qualified type of transmission, but the only difference is that once the spirits of the passive body acquire the motion of the transmitter, they can form an image, because they are part of a vital spirit, which means they have imagination as one of their functions.

6 Conclusions

Natural magic, for Bacon, is the most noble operative part of natural philosophy, as it aims at the transformation of nature. But as Bacon emphasises, time and again across his writings, magic has a bad reputation because of the abuse of both learned magicians, such as those pertaining to the “school of Plato,” and of ordinary witches and wizards. However, once cleansed of all these superstitions and fables, natural magic can be reinstated in its rightful place as a noble science. The part of magic that is most corrupted is that dealing with the power of the human mind, about which so many stories have been invented. My claim is that Bacon’s project of ‘purging’ natural magic can be seen as a project of ‘naturalisation.’ This means that, from the beginning, all phenomena must be explained in terms of natural and not supernatural powers, which is to say that the limits of operation coincide with the limits of matter. Naturalisation implies that all phenomena can be included in a philosophical and experimental study of nature.51

In this paper, I traced Bacon’s steps in applying his research methodology to magic. I started with Bacon’s classification of different types of action at a distance, and the delimitation of the work of imagination from other kinds of transmission of entities at a distance, and the use of analogical thinking. Then, I analysed the other characteristics of Bacon’s methodology: besides purging the existing corpus of both false theories and invented ‘experiments’ with regard

51 For a similar claim on the need to explain action at a distance without recourse to obscure principles, see Garau’s article in this special issue.
to fascination, Bacon naturalised magic by introducing quantification and measurement, as well as the need for replicability and the diversification of experiments. After discussing the powers of the imagination and fascination within Bacon’s work, I moved to the issue of the ontology of transmission, situating Bacon within the existing models of action at a distance. For him, all communications from one body to another are done through the transmission of some material particles, rarefied and very subtle, which makes that entity imperceptible to the human senses. This means that, for Bacon, all communication is done by contact, through a medium, and only at a certain distance. Bacon's is a hybrid model: it is neither simply quantitative, nor merely qualitative. What the spiritual particles bring with them is a certain kind of motion, and these motions are qualitatively distinct from one another.

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