

FIRST LETTER (JANUARY 1, 1681)

I

Occasion of the Work

You were correct, Monsieur, when you wrote me that those who did not have the opportunity to see the comet while it was appearing before daybreak, toward the end of November and the beginning of December, would not wait long to see it at a more convenient hour. For indeed it began to reappear the 22nd of last month, at nightfall; but I doubt very much whether you were correct to exhort me to write you all I might think about this matter, and to promise me a very exact response to all I should write you of it. This goes farther than you might think: I do not know what it is to meditate regularly on one thing; I am very easily led astray; I wander very frequently from my subject; I jump into places the paths to which one would have much difficulty in guessing; and I am very much apt to make a doctor, who wants method and regularity throughout, lose his patience. This is why, Monsieur, you must think it over well: give thought more than once to the proposition you have made to me. I give you a period of two weeks to make your final decision. This advice, and the wishes I make for your prosperity in this renewal of the year, are all the New Year's gifts you will have from me for now.

I am your, etc.

A . . . , January 1, 1681

SECOND LETTER (MARCH 1, 1681)

2

With What Method It Will Be Written¹⁸

Since after having thought about it well, you persist in wanting me to communicate to you the thoughts that will come to mind in meditating on the nature of comets, and to engage you to examine them regularly, I must resolve to write you. But you will allow, please, that I do so during my hours of leisure and with all manner of liberty, as the things shall present themselves to my thought. For as regards the plan that you would wish me to carry out from the beginning, and that you would like me to follow point by point, I beg you, Monsieur, not to expect it. That is good for au-

18. Section title first appears in the edition of 1699.

thors by profession, who should have coherent and formal views. They do well to make a plan at the outset, to divide it into books and chapters, to form for themselves a general idea of each chapter and to work only on each idea in its place. But for me, who do not claim to be an author, I shall not subject myself, if you please, to that sort of servitude. I have told you my ways: you have had the time to examine whether they will accommodate you. Accordingly, if you find yourself overwhelmed by them, do not impute the fault to me: it is as you wished. Let us begin.

3

That the Presages of Comets Are Not Supported by Any Sound Reason

I hear a number of persons reasoning every day on the nature of comets, and although I am not an astronomer in fact or by profession, I do not fail to study carefully all that the most clever have published on this matter; but I must admit to you, Monsieur, that none of it appears convincing to me, except what they say against the error of the people, who want comets to threaten the world with an infinite number of afflictions.

It is this that makes me unable to understand how so great a doctor as you—who should be convinced, simply by having predicted correctly the return of our comet, that these are bodies subject to the ordinary laws of nature and not prodigies that follow no rule—has nevertheless allowed himself to be drawn along by the torrent and imagines, with the rest of the world, despite the reasons of the select few, that comets are like the heralds of arms who come to declare war against mankind on behalf of God. If you were a preacher, I would pardon you for it because these kinds of thoughts, naturally very suited to be dressed in the most pompous and most pathetic ornaments of eloquence, do much more for the honor of him who pronounces them, and make much more of an impression on the consciousness of the listeners, than do a hundred other propositions demonstratively proved. But I cannot appreciate that a doctor, who has nothing to persuade the people of and who should nourish his mind only with an altogether pure reason, has such poorly supported sentiments in this matter and contents himself with tradition and passages from poets and historians.

4

On the Authority of Poets

It is not possible to have a more miserable foundation. For, to begin with the poets, you are not unaware, Monsieur, that they are so intent on strewing their works with a number of pompous descriptions, like those of prodigies, and on giving something of the marvelous to the adventures of their heroes, that to achieve their ends they imagine a thousand astounding things. So far from believing, on the basis of their word, that the overturning of the Roman Republic was the effect of two or three

comets, I would not even believe that any appeared at that time, if there were none other than they to assert it. For in the end, one has to imagine that a man who has put himself into the spirit of making a poem has at that moment grasped the whole of nature. Heaven and Earth no longer act except by his order; eclipses and shipwrecks happen if it seems good to him; all the elements are moved as he finds appropriate. One sees armies in mid-air and monsters on land to the extent he wishes it; angels and demons appear every time he orders it; the very gods, mounted on machines, keep themselves at the ready to meet his needs; and since, above all else, he needs comets because of the prejudice we have concerning them, if he finds some for himself from among all the facts in history, he seizes on them appropriately; if he does not find any, he makes them up himself and gives them the color and shape most conducive to making it appear that Heaven is interested, in a most distinguished way, in the affair in question. After this, who would not laugh to see a very great number of intelligent people give, as the whole proof of the malignity of these new stars, the "terris mutantem regna cometen"¹⁹ of Lucan; the "regnorum eversor, rubuit lethale cometes"²⁰ of Silius Italicus; the "nec diri toties arsere cometae"²¹ of Virgil; the "nunquam teris spectatum impune cometen"²² of Claudian; and similar fine dicta of the ancient poets?

5

On the Authority of Historians

As for what pertains to historians, I admit that they do not give themselves the freedom to imagine extraordinary phenomena in this way. But for the most part there appears so great a desire to relate all the miracles and visions the credulity of peoples has authorized that it would not be prudent to believe all they pronounce of this sort. I do not know whether they believe their histories would appear too simple if they did not mix into the things that happen according to the course of the world a good number of prodigies and supernatural accidents; or whether they hope that through this sort of seasoning, which very much gratifies the natural taste of man, they will always keep their reader in suspense by always giving him something to wonder at; or again whether they persuade themselves that the opportunity these miraculous occurrences supply will make their history conspicuous in time to come. But be this as it may, it cannot be denied that historians take extreme pleasure^a in compiling everything that smacks of a miracle. Titus Livy supplies us with a very powerful proof of this, for although he was a man of great sense and very elevated genius, and although he has left us a history very nearly approaching perfection, nonetheless he succumbed to the defect of leaving us an intolerable compilation of all the ridiculous prodigies that Pagan superstition thought should be expiated—which was the cause, according to what

19. *Bellum Civile* 1. 529 ["a comet changing kingships on earth"].

20. *Punica* 8. 637 ["Overturner of kingdoms, a comet with its lethal glow"].

21. *Georgics* 1. 488 ["and never did fearful comets blaze so often"].

22. *De Bello Getico* 26. 243 ["and never was a comet seen on earth with impunity"]

some say,^b of his works being condemned to the fire by Pope St. Gregory. What disorder is not seen in those great and immense volumes that contain the annals of the various orders of our monks, in which, it seems, pleasure was taken in amassing, without judgment and with the sole desire of satisfying the rivalry or rather the jealousy that these societies have of one another, all the chimerical miracles one can conceive of? Let this be said among ourselves, Monsieur, for you know well that, in order not to scandalize the people or irritate these good Fathers, one should not make public the defects of their annals, contenting ourselves with not reading them.

I am surprised^c that those who speak to us so much of the sympathy there is between poetry and history, who assure us on the faith of Cicero and Quintilian that “history is poetry free of the servitude of versification,” and on the testimony of Lucian that “the vessel of history will be ponderous and without movement, if the wind of poetry does not fill its sails”; who tell us that one must be a poet in order to be an historian and that the descent from poetry to history is almost imperceptible, although no one has thus far undertaken to pass from the one to the other; I am surprised, I say, that those who teach us so many fine things—without knowing^d that Agathias was successively a poet and an historian and that he believed to be doing by this nothing other than crossing from one country to another—were not apprehensive about supplying a fine pretext to critics to reproach historians because they do in fact have a marvelous sympathy with poets and that they like as much as the poets to relate prodigies and fictions. Fortunate are those two excellent poets who work on the history of Louis Le Grand, filled as it is with actual prodigies, for without entering into fiction, they can satisfy the dominant desire that grips poets and historians to recount extraordinary things!

With all this, Monsieur, I am not of the view that one may quarrel with the authority of historians; I agree that, without regard to the credulity of historians, one may believe comets to have appeared as much as they indicate and, in the years following the appearance of comets, all the misfortunes they relate to have happened. I agree to all this: but it is also all I accord you and all you should reasonably claim. Let us see now where all this will lead. I defy you, with all your subtlety, to conclude from it that comets have been either the cause or the sign of the misfortunes that have followed their appearance. Thus the testimonies of historians are reduced to proving only that comets appeared and that subsequently there were indeed disorders in the world; which is very far from proving that one of these two things is the cause or the prognostic of the other, unless one is willing to permit a woman, who never puts her head out the window on rue Saint Honoré without seeing carriages pass, to imagine that she is the reason why these carriages pass, or at least that she should be a presage to the whole neighborhood that, when she shows herself at her window, carriages will soon pass.

a. Quidam incredibilium relatu commendationem parant et lectorem aliud acturum, si per quotidiana duceretur, miraculo excitant. Quidam creduli, quidam negligentes sunt, quibusdam mendacium obrepat, quibusdam placet. Illi non evitant, hi appetunt et hoc in commune de tota natione, quae approbare opus suum et fieri populis non putat posse, nisi illud mendacio as-

persit. ["Some (historians) gain praise by relating incredible things, and by means of the marvellous they arouse a reader who would act otherwise if he were led through ordinary events. Some are credulous, some are negligent. Falsehood creeps up on some, some it pleases; the former do not avoid it, the latter seek it. So much then for this whole tribe in common, which does not think its works can be approved of and become popular unless it sprinkles them with lies."] Seneca *Natur. Quaest.* 7. 16.

b. See Gérard-Jean Vossius *De Histor. Latin.*, p. 98.

c. Fr. Le Moine *Discours de l'Histoire*, ch. 1.

d. Agathias *Hist.* beg.

6

That Historians Take Great Pleasure in Digressions

You will say to me, no doubt, that historians note positively that comets have been signs or even the causes of the ravages following them, and as a result that their authority goes much farther than I say. Not at all, Monsieur; it may be that they have noted what you say, for they very much like to make reflections, and they sometimes push the moral lesson so far that a reader, dissatisfied at seeing them interrupt the thread of the history, would gladly say to them, if it were up to them, *riservate questo per la predica*.²³ The desire to appear learned, even in things not in their field, sometimes also leads them to make digressions they understand very poorly, as when Ammianus Marcellinus,^a on the occasion of an earthquake that happened under the empire of Constantius, tells us all his Aristotle and all his Anaxagoras; reason is lost sight of; he cites poets and theologians; and on the occasion of a solar eclipse under the same Constantius, throws himself recklessly into the secrets of astronomy, gives lessons on Ptolemy, and wanders so far as to philosophize on the cause of parhelions. But for all this, it does not follow that the remarks of historians should authorize the common opinion, because those remarks do not bear on things within the province of the historian. If it were a matter of a Council of State, a peace negotiation, a battle, a siege of a city, or the like, the testimony of history could be decisive because it may happen that the historians had searched through the archives and the most secret instructions and drawn from the purest sources the truth of the facts. But concerning the influence of the stars and the invisible springs of nature, the historian gentlemen no longer have any particular authority and should not be regarded more highly than a simple individual who hazards his conjecture that must be valued according to the degree of knowledge its author has acquired in physics.²⁴ Now, on this basis, Monsieur, admit to me that the testimony of historians is reduced to a very little thing because ordinarily they are very miserable physicists.

a. Ammianus Marcellinus *Historia* 17.7.11.

23. "Reserve this for the sermon."

24. Or, "natural philosophy." *Copyrighted Material*

7

On the Authority of Tradition

After what I have just said, it would be superfluous to refute in particular the prejudice based on tradition, for it is manifest that if the predisposition one has had since time immemorial in the matter of comets can have any legitimate foundation, it consists entirely in the testimony that the histories and other books have given throughout the centuries. As a result, if this testimony should not be of any consideration, as I have proved and as will appear still more in what remains for me to say, it is no longer necessary to take into account the multitude of votes founded thereon.

Would that we could see what happens in the minds of men when they choose an opinion! I am certain that if this were possible, we would reduce the vote of an infinite number of people to the authority of two or three persons who, having pronounced a doctrine one supposed they had thoroughly examined, persuaded a number of others of it through the prejudice in favor of their worth, and these latter a number of others, whose natural laziness found its account in believing in one fell swoop what they were told, rather than in examining it carefully.^a As a result, the daily increase in the number of credulous and lazy partisans has been a new incentive to other men to relieve themselves of the trouble of examining an opinion that they see is so widespread and that they are persuaded simply could not be so except on account of the solidity of the reasons used to establish it to begin with; and in the end one imagined oneself reduced to the necessity of believing what everyone believed, for fear of being taken as a factious person who by himself wants to know more than all the others and to contradict venerable antiquity, such that there was merit in no longer examining anything and in relying on tradition. Judge for yourself whether one hundred million men pledged to some sentiment, in the manner that I have just represented, can make it probable and whether the whole great prejudice that is erected on the multitude of so many partisans should not be reduced, doing justice to each thing, to the authority of two or three persons who apparently have examined what they teach. Recall, Monsieur, certain fabulous opinions to which one has given chase recently; recall the rather great number of witnesses that supported them, for it has been shown that these witnesses, having copied one another without otherwise examining what they were citing, should have been counted as but one; and on this basis conclude that although several nations and several centuries agree in accusing comets of all the disasters that happen in the world after their appearance, it is nevertheless not a sentiment of greater probability than if there were only seven or eight persons who knew it, because there are scarcely more people who believe or had believed this, after having examined it well on the principles of philosophy.

a. Unusquisque mavult credere quam judicare: nunquam de vita judicatur, semper creditur versatque nos et praecipitat traditus per manus error alienisque perimus exemplis. Sanabimur si modo separemur a coetu. Nunc vero stat contra rationem defensor mali sui populus. ["Everyone prefers to believe rather than to judge. One never makes a judgment about life but always believes, and an error that has been passed on from hand to hand turns us this way and

that and ruins us. We perish by the example of others; we shall be cured if in some way we may separate ourselves from the crowd. But as it is, the populace stands firm against reason as the defender of its own vice.”] Seneca *De Vita Beata* 1.2.

8

Why the Authority of Philosophers Is Not Spoken Of

In addition, Monsieur, do you wish to know why I have not taken into account the authority of philosophers, as well as that of poets and historians? It is because I am persuaded that if the testimony of philosophers has made some impression on your mind, it is only because it makes the tradition more widespread and not because of the reasons by which that testimony is supported. You are too clever to be the dupe of some philosopher, whoever he may be, provided that he attacks you only by the path of reasoning, and it is necessary to do you this justice, that in the things you believe to be within the province of reason, you follow only an altogether pure reason. Thus, it is not the philosophers as philosophers who have contributed to your being vulgar in this matter, since it is certain that all their reasonings in favor of malignant influences arouse pity. Do you want, then, for me to tell you, as an old friend, whence it is that you come to have a common opinion without consulting the oracle of reason? It is because you believe there to be something divine in all this, as has been said of certain illnesses, in accord with the famous Hippocrates; it is because you imagine that the general consent of so many nations in the course of all the centuries can come only from a kind of inspiration, *vox populi, vox dei*;²⁵ it is because you have become accustomed, in your capacity as theologian, not to reason any longer where you believe there to be something of a mystery, which is a very laudable docility but which sometimes does not fail, by the excessive scope sometimes given to it, to encroach on the rights of reason, as Monsieur Pascal has noted very well^a; finally, it is because, having a fearful conscience, you easily believe the corruption of the world equips the arm of God with the most horrible calamities which, however, God does not wish to cast down on earth without having tested whether men will make amends, as he did before sending the deluge. All this, Monsieur, makes a sophism of the authority of your mind against which you could not defend yourself with all the skill that makes you so good at disentangling the false reasonings of the logicians.

This being so, one should not set one's hopes on correcting you when reasoning with you on the principles of philosophy. One must leave you there or else reason on the principles of piety and religion. This is also what I will do (for I do not want you to escape me), after having set forth for you to see, so as to indemnify myself in some way, several reasons founded on good sense which convict of temerity the opinion people have concerning the influence of comets. Guess, if you can, what these principles of piety are that I keep in reserve for you; guess, I say, if you can, while I in

25. "The voice of the people is the voice of God."

my hours of leisure prepare for you a kind of prelude that will proceed on the basis of the most common principles.

A . . . , March 15, 1681

a. *Pensées*, ch. 5 [ed. L. Brunschvicg, ## 253, 268, 270, 273].

THIRD LETTER (APRIL 13, 1681)

9

First Reason against the Presages of Comets:
That It Is Very Probable That They Do Not Have
the Capacity to Produce Anything on Earth

Here, Monsieur, are some reasons drawn from philosophy. One can say, to begin with, that it is very uncertain whether bodies so far from the earth as these can convey to it any matter capable of great action. For if it is the universal sentiment of the philosophers (since one has been constrained to abandon the common opinion bearing on the subject of comets) that the atmosphere of the earth—that is, the space through which are spread the exhalations and vapors the entire earth emits—comes to an end in the middle region of the air at an elevation of three or four leagues at most, why will one believe that the atmosphere of comets extends several million leagues? One could not say precisely why planets and comets can produce qualities as far as the earth, capable of causing notable changes there, while the earth cannot produce any even to a distance of thirty leagues.

10

Whether They Convey Something Other than Light²⁶

(1) Will it be said that, since comets convey light to us, they can indeed convey something else to us? But it is easy to respond that the light they send us comes originally from the sun and that they contribute to its being conveyed to earth only in their capacity as opaque bodies that compel the rays to be reflected toward us; as a result, whatever supposition one may make use of to explain the propagation of light, be it the principles of Aristotle, those of Epicurus, or those of Monsieur Descartes, one will conceive very clearly that comets can shine on us without any positive action on their part and without the least part of their substance being detached to come to this lower world.

26. Section title first appears in the edition of 1699. Here and throughout §§10–12, “light” translates *lumière*. *Copyrighted Material*

II

Whether Their Light Detaches Any Atoms²⁷

(2) Will it be said that light detaches a quantity of atoms from the body of the comet and brings them to our world while it itself comes by reflection? But if one says only this, I have no need of a new response: it suffices for me to say that the atoms that the sun's light causes to rise from the earth and from the waters follow the reflected light only to a very small distance and that one must reason in the same way concerning those the sun causes to rise from other bodies.

I2

What the Activity of Their Light May Be

(3) Will it be said that even the light reflected by comets is capable of producing great effects? This does not seem so, since it is certain that this light no longer exists when the effects one attributes to comets are produced and that, in addition, the influence of this light is very weak in regard to us, since no lamp lit in the midst of a field illuminates and heats the surrounding air any more than does a comet. Thus, as it would be ridiculous to attribute to the light from this lamp the force to produce great changes in the sphere of its activity, apart from illumination, it is ridiculous also to attribute to the light of comets the force to alter our elements and to trouble public tranquillity. Not to mention that, the light of comets being only that of the sun extremely weakened, it is as absurd to attribute to it effects that the sun itself cannot bring about, as it would be to imagine that a candle lit in the middle of a square would heat all the inhabitants of a large city, when a good fire lit in the bedroom of each cannot protect them from the cold.

I3

That It Is as Difficult for Exhalations to Descend
as It Is for Them to Rise

(4) Will it be said that there is a considerable difference between the earth and comets and that although the earth's exhalations cannot rise up to the region of the comets, it does not follow that the capacity of comets cannot extend to us, because it is much easier to descend than to rise and because it is necessary to rise in order to go from here to the region of the comets, but it is necessary to descend to come from there to here? Yet it is not difficult to overturn this objection. For if it has any force, it is only because one supposes that the earth is at the center of the universe and that all weighty bodies have a natural inclination to approach this center. Now, as there is

27. Section title first appears in the edition of 1699.

nothing more difficult than to prove these suppositions, there is nothing easier than to destroy all the reasonings founded on these ideas. How does one know that the earth is at the center of the universe? Is it not evident that in order to know the center of a body, one has to know its surface, and as it is not possible for the human mind to note where the extremities of the universe are, it is impossible for us to know whether the earth is at the center of the universe or whether it is not?

Moreover, how do we know that there are bodies that have a natural inclination to approach the center of the universe? Do we not know, to the contrary, that all bodies that move around a certain center distance themselves from it as much as they can? Has not our experience of this forced the partisans of Aristotle to recognize, with Monsieur Descartes, that it is one of the general laws of nature? There is therefore nothing more absurd than to suppose there to be bodies that naturally tend toward the center of the earth, and it is much more reasonable to say that they all tend to distance themselves from it; and that those that have the capacity to do so, distance themselves in fact: whence it happens that those that have less force are impelled toward the center, because, the whole being filled up, it is impossible for a body to distance itself from a place without another coming toward it.

It is easy to show in accordance with this that it is a gross mistake to imagine that the exhalations of comets can descend to earth more readily than the exhalations of the earth can rise to heaven, for whatever system is used, it must necessarily be agreed that there is in the universe a very considerable movement around a common center. Whether this be around the earth as the philosophers of the university wish, or around the sun as the partisans of Copernicus wish, or partly around the sun and partly around the earth, as the partisans of Tycho Brahe wish, matters little to me at present; it is still true that comets come to be seen in a place where there are bodies that turn around a certain center. As a consequence, all these bodies tend with all their force to distance themselves from this center and have a greater capacity to distance themselves than all the bodies between them and the earth. Whence it follows that the matter surrounding the comets has no facility for descending to earth and that it is as difficult for it to descend to it as it is difficult for terrestrial matter to rise to heaven. If one were to consider the trouble involved in making a balloon filled with air descend into water, it would not be said universally that it is more difficult to rise than to descend; this is true only in regard to bodies that have no capacity to distance themselves from the center of movement, but in regard to those that have had the force to distance themselves prodigiously, it is in making them descend that one will find some trouble. Since, therefore, comets are at a prodigious distance from the center of movement, it is correct to conclude that a frightful trouble would have to be taken to make something descend from that locale to earth, which by itself is capable of refuting all the illusions of astrology.

Permit me, please, Monsieur, to say that all the matter there is from here to beyond Saturn and the comets, forms one great vortex; and allow me to name it the sun's vortex. I do not ask this of you to cause the least detriment to your Ptolemaic system; it is only to express in few words what I will say to you concerning it.

14

That the Exhalations of Comets, Even if They Should Reach Earth, Would Not Produce Anything There²⁸

Let us grant that comets can impel a quantity of exhalations to the earth. Does it follow that men will be noticeably altered thereby? Not at all, for if these exhalations should traverse such immense spaces, they would be broken up and divided into an infinite number of imperceptible particles that would spread throughout the whole extent of the sun's vortex, much as particles of salt are distributed throughout the whole mass of the water that dissolves them. Now, if we compare the comet with the whole of the sun's vortex, we will find that it is not, in regard to this vortex, what even a grain of salt is in regard to a cubic league of water; and as a consequence there is reason to believe that if the whole comet, reduced to powder, were put by infusion into the great vortex of the sun, it would not bring with it an alteration more considerable than that which a grain of salt cast into a cubic league of water would produce in all parts of this water. Everyone knows that in order for a liquid to produce any considerable effect, it is not sufficient that it be permeated by certain spirits; it must possess a certain dosage of them. Similarly, I say that in order for our air to undergo great alterations, it is not sufficient that it be permeated by some fragments of the comet, because of the quantity of matter that is contained in the extent of the vortex; rather it must receive a more copious dosage of it. Nonetheless it is certain that it can only have its portion—I do not say of the whole comet (for it is not dissolved in the liquids of the vortex) but rather of the atoms that the comet sows here and there, which amount to nothing for each part of our world.

I am not afraid that one may object to me that only the earth has a share in this, for this would be to suppose that comets send to it alone all their exhalations and that they prevent their bits from making any departure in a trajectory of prodigious length, which cannot be said without extravagance. Neither am I afraid that one may come to me to say that perhaps comets are not so far from earth as those who place them well beyond Saturn suppose. This objection has no force against me because whether one places them a little on this side or a little on that side of Saturn, one must agree that their evaporations belong equally to all parts of the sun's vortex, as much to those that are between Jupiter and Mars as to those that surround the earth, as much to those that are on the far side of Saturn as to those that are on this side. In fact, if a comet placed between Jupiter and Saturn has the capacity to push the matter by which it is surrounded to the center, it should also have the capacity to propel it away from its circumference almost as much, for it is not more difficult to make weighty bodies rise than to make light bodies descend, as appears from the example of a large balloon one has so much trouble pushing into the water. Thus we must take into account that the discharges coming from the comet are spread in every direction throughout the whole extent of the sun's vortex, much as the parts of a piece of sugar held suspended in a glass of water would spread above and below throughout the capacity of the glass,

28. Section title first appears in the edition of 1699.

and this all the more easily in that the whole of the vortex's matter is in continual motion. Since, therefore, the whole comet, liquefied in the fluid of the vortex, would not be like even a grain of salt liquefied in a cubic league of water (which is a quantity in which I believe neither antimony nor any venom preserves its active qualities), it is true to say that the influences of comets, which contain so little substance in comparison with comets themselves, would not be capable of a great effect even if they should reach us.

15

Refutation of Those Who Say That This Is Not
Impossible or Who Would Like to Maintain
That the Influences Are Not Corpuscles²⁹

(5) Will it be said, finally, that it is not impossible for comets to convey to earth either matter or a quality that is very active? This is the most reasonable thing one can advance, and nevertheless it is to say nothing because it is not only possible it is also very apparent that comets do not convey to earth either a quality or matter capable of great influence and that in things where there is no more reason on one side than on the other, the error is always more on the side of those who affirm than on the side of those who suspend their judgment. As a result, there being no positive reason that leads us to believe in the influence of comets and there being, to the contrary, several that lead us to reject it, those who take the first position have all the error on their side.

I ask you, Monsieur, to note well that I just distinguished the qualities produced by comets from the corpuscles they convey, in order to accommodate myself to the philosophy of the university and for fear that you may come to believe that my objections would have no force were I to suppose the usual principles bearing on the propagation of accidents. To prevent this, I declare here that although in the whole rest of this writing I refute the influences of comets only on the basis of the idea of atoms and corpuscles, I nevertheless claim that my reasons should have the same force against those influences that would consist in pure qualities distinct from matter. And even in the present case I would have a much greater advantage over a Peripatetic because, if he wishes to reason consistently, he is obliged to say that when the comet is no more, the malignant qualities that it had produced beyond it are entirely destroyed by the substantial forms of each subject which permit there to be, according to him, a foreign quality only for so long as the cause that violently introduced this foreign quality maintains and preserves it. Whence it manifestly results that nothing of what happens after the destruction of the comet can be produced by the qualities of the comet, but at the very most by the atoms it spread here and there.

Apart from the fact that experience makes us see that the qualities of bodies are produced only in a certain space called *the sphere of their activity*, it is as absurd according to the principles of Aristotle to say that the comet communicates its qualities

29. Section title first appears in the edition of 1699.

to the whole of the sun's vortex as it is absurd to say it according to the principles of the other philosophers, since the partisans of Aristotle are obliged to acknowledge that what they call pure accidents have no less trouble spreading themselves in all directions than do the discharges of atoms, in which the other sects make the production of corporeal qualities consist.

16

Second Reason: That if Comets Had the Capacity
to Produce Something on Earth, This Could Be
as Much Good Fortune as Bad

One can say in the second place that, supposing comets spread corpuscles to the earth capable of great action, there is no more reason to maintain that they should produce plague, war, or famine, than there is to maintain that they should produce health, peace, and abundance, since no one knows the nature of these corpuscles—the form, movement, or other qualities of their parts. And in fact, in maintaining that the present comet, which cannot prevent an excessive cold while it appears in its entirety, will cause war three years after it has ceased to exist because, by heating the blood's mass, it will make men more hot-headed—is there more good sense in maintaining this than there is in maintaining that it will support peace because, by cooling the blood's mass, it will make men wiser?

Yes, I will be told, there is more good sense in the first position than in the other; for it is more obvious that the coarse matter that comes to us from the extremities of the sun's vortex, not being proportioned to terrestrial bodies, makes everything askew among us, than it is obvious that it brings or preserves any favorable dispositions here. It is very probable that it increases the cold in winter and the heat in summer because, being more difficult to set in motion, it should increase the cold and rest when there is no force to put it into motion and when, once heated, it should have much more heat than does light matter. Whence it is that red-hot iron burns much more than the alcohol flame and that fire is more violent when the cold is extreme, for it very much appears that the cold affects the wood in such a way that the parts of it the fire releases on each occasion are more massive.

But I respond that these are all groundless conjectures and that one can fashion as many likelihoods by taking the opposite position. Who will prevent me from saying that this coarse matter, thickening the air and facilitating the condensation of vapors, should decrease the cold and the heat according to the season in which one finds oneself: the cold, because it is never more violent than when the air is calm and pure;^a the heat, because it is never more unbearable than when the sun darts its rays upon us, without encountering any clouds, and because the rains that give rise to the condensation of vapors refresh the air exceedingly? I can imagine, further, that this coarse matter, managing to hurl itself down, is a leaven and a fatty substance that should make the earth fertile, like the corpuscles the Nile leaves in the places it has flooded. Another will say with as much reason that in truth this coarse matter causes a biting

cold that purifies the air of all seeds of illness; but that it gradually becomes more refined, the coarser falling to earth as a fatty sediment full of the sources of fecundity, while the rest retains only the solidity necessary to temper the heat from time to time by means of the condensation of clouds and by the rains, as salutary for health as for the harvest.

Can another be prevented from saying that this gross matter in fact has the leisure to filter and refine itself before coming to us, since it has a trajectory of several million leagues, and that, if it still has what is required to thicken our air, this should be counted as one of those fogs that sometimes last for seven or eight days without consequence, or as one of those rains that disturb the river water for a time, without it being noticed that the fish fare any less well?

a. Et positas ut glaciem nives, puro numine Jupiter. ["And how he may freeze the settled snows, Jupiter with his pure divinity."] Horace *Ode* 3.10.

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Third Reason: That Astrology, Which Is the Foundation of the Particular Predictions Relating to Comets, Is the Most Ridiculous Thing in the World

I say, in the third place, that the particulars of the presages of comets, proceeding solely on the basis of the principles of astrology, can only be very ridiculous because there has never been anything more impertinent, anything more chimerical, than astrology, anything more ignominious to human nature, to the shame of which it will eternally be true to say that there were men deceitful enough to fool others under the pretext of knowing the things of heaven, and men stupid enough to give credence to them, to the point of establishing the duty of astrologer as a titular office and not daring to get a new suit of clothes or to plant a tree without the approval of the astrologer.^a

Do you want to know, from a man of this profession, what the presages are of this or that comet in particular? He will reply to you that the particular capacity of a comet depends on the character of the sign and of the house in which it began to be visible, as well as on its aspect relative to the planets. It is to this position that one must principally look to make a good horoscope of a comet, to which one may add the consideration of the signs it passes through in succession. Thereupon he will instruct you that there are masculine signs and feminine signs, that there are terrestrial and aqueous ones, cold and hot, diurnal and nocturnal, and so on; that each planet dominates a certain portion of the earth and a certain kind of people and thing. Saturn, for example, dominates Bavaria, Saxony, and Spain, a part of Italy, Ravenna and Ingolstadt, the Moors and the Jews, ponds, cesspools, cemeteries, old age, the spleen, the black, the tan, and the sour; for there is nothing, right down to colors and flavors, that they do not share in. He will add that the signs, and particularly those of the Zodiac, also have their departments marked on the earth's globe, so as to exercise their

capacity on it: the Ram, for example, dominates all things subject to the planet Mars, its host (for you will note that each planet has its dwelling fixed in a certain sign), which are the north, a part of Italy and Germany, England and the capital of Poland, the liver, bile, soldiers, butchers, sergeants, executioners, the red, the bitter, and the prickly. And beyond this, it reigns over Palestine, Armenia, the Red Sea, Burgundy, the cities of Metz and Marseille. He will tell you, moreover, that there are twelve houses to consider in the heaven, each of which has its particular functions and belongs to a certain planet; for, as an example, the first house relates to the life and constitution of the body and the last to enemies, prison, and the fidelity of domestic servants. Mercury thrives in the first house more than all the other planets and from there distributes a happy life and strong constitution. Venus thrives in the fifth, where she promises joy through children.

Assuming this to be so, together with several other remarks of the same nature, the astrologer will tell you against which country and against which people or which beasts the comet principally bears a grudge, and with what sort of evils it threatens them. In the Ram, the comet signifies great wars and great mortality, the humbling of the great and the elevation of the low, and unbearable droughts in those places subject to the dominion of this sign. In the Virgin, it signifies dangerous miscarriages, maletotes, imprisonment, and the sterility and death of a number of women. In the Scorpion, there are, beyond the preceding evils, innumerable reptiles and grasshoppers. In the Fish, disputes on matters of faith, unbearable apparitions in mid-air, wars and plagues, and always the death of great men.

If by misfortune comets happen to pass through the signs bearing a human figure, like the Twins, the Virgin, Orion, and so forth, it is against men that they take their revenge. If they pass through the signs of the Ram, the Bull, the Swan, the Eagle, or the Fish, it is against animals of this kind they bear a grudge, and if the signs are masculine it is males who suffer, if feminine, females. If comets pass through the shameful parts of some constellation, it is a distressing presage for the unchaste. If the comet is Saturnian by its position, or by its aspect, it produces all the miserable effects of Saturn: jealousy, melancholy, mistrust, and terrors. If it is in the second house, which is that of riches, it thwarts gain and causes thefts and bankruptcies, and so on with the rest, for in general an astrologer judges the capacity of a comet by the rules according to which he claims that this or that sign in this house, in this aspect, presages this or that to this or that thing.^b

Rarely are comets made to signify any good fortune. Nevertheless there was a Swiss astrologer who, having noted in 1661 that a comet had passed through the sign of the Eagle and had come to die at its feet, made assurances that this presaged the ruin of the Turkish Empire at the hands of that of Germany; this the event so little justified that, two years later, the Turks thought of taking the whole of Hungary and apparently would have invaded all the hereditary territories of the House of Austria had the aid sent from the king to the emperor not put him into a position to make peace with the Porte. It is the same with the predictions of the astrologers as with those of the poets: they both are readily gloomy in regard to the Ottomans, but without any consequence. For more than a century, French poets have been singing to us in an oracular tone that our kings will dethrone the great Turk and erect trophies on the

banks of the Jordan and the Euphrates. The redoubtable Monsieur Des-Preaux, who had made so much fun of these sallies, in the end succumbed to them himself with his "I will wait for you in two years' time on the banks of the Hellespont," and he too was as false a prophet as his colleagues.

The reasoning of astrologers on such extravagances does not date from today. It was the same in Pliny's^c time: "It is claimed (he says) that it is not a matter of indifference that comets dart their rays toward certain places, or receive their capacity from certain stars, or represent certain things, or shine in certain parts of the heaven. If they resemble a flute, their presages apply to music; when they are in the shameful parts of a sign, it is against the unchaste that they bear a grudge; if their position forms a triangle or an equilateral square in regard to the fixed stars, they apply to the sciences and the mind. They spread poison when they are in the head of the northern or southern Serpentarius."

Consider, I beg you, Monsieur, whether it is not to have lost all shame to posit principles of this sort. What, because a comet appears to us to correspond to certain stars that it pleased the ancients to call the sign of the Virgin—so as to accommodate the poetic fictions which state that Justice, or the *Astraea Virgo*, disgusted with a world as corrupt as ours, flew away from it^d to Heaven—women will be sterile, or will have false labors, or will not find husbands? I see nothing more poorly connected than that.

It is pure caprice that makes this sign represent the figure of a woman, for at bottom it no more takes after a human figure than anything else. But even if it were true that it did take after a human form, do we have eyes good enough, with the aid of our best telescopes, to discern that it resembles a woman and not a man? And if we could carry our discernment that far, could we know that it is the figure of a girl rather than a woman? And finally, even if we could make all these subtle distinctions and know clearly that a certain number of stars are so situated that they form the figure of a girl, would it follow that they could convey to a body perhaps thirty million leagues away, influences contrary to the multiplication of mankind? One would be incomparably more correct to advance this impertinence: that if a baker were to form the figure of man or woman on a cake, it would be changed into poison for all the men or all the women who would eat it. Surely what the astrologers say merits the censure one reads in Pliny of another kind of liar, that "to have said this seriously is to give witness that one has an extreme disdain for men and that the impunity for lying has risen to an inexcusable excess."^e

I will not amuse myself by proving what I advance so boldly against the vanity of judicial astrology, for apart from the fact that you do not doubt what I say on that score, I know there are a number of fine treatises known the world over that show in the most convincing manner in the world the falsity of this chimerical and impostor art. I do not believe that anyone ever undertook to write against astrologers who did not overwhelm them and who could not say, in the way the Romans used to say of Africa, that "it was for them a harvest of triumphs." If there is some author who has written against astrology without mortally wounding it, he surely performed a very difficult exploit that would gain for him a considerable pension under a prince of the temper of Emperor Gallienus, or a royal and princely combat given to a cavalier be-

cause, after entering the lists against a bull, he ran for a very long time without giving it a blow, which Gallienus^f found to be of meritorious difficulty.

Thus it was no trouble for a genius as prodigious as the famous Comte de la Mirandola to work to confound astrology: an average mind could have done it well. This was to use the arrows of Hercules to kill little birds, as Philoctetes did during the siege of Troy,^g and to make an eagle fight against a fly. It is therefore altogether manifest that this Comte judged astronomy worthy of his wrath only because, extremely absurd as it is, persons of the highest rank did not fail, by their example, to make it much in vogue; for it is always these persons who are the most curious about the future, their ambition giving them an extreme impatience to know whether fortune destines for them all the grandeur they wish for, and to possess, if only through promises, the elevation to which they aspire. It is very likely as well that the astrologers of that time waited until this learned adversary was dead to predict that he would die at thirty-two years of age, which was all the response they boasted of in opposition to his books, for it is not a very certain thing to threaten before the fact those who write against astrology. Witness that astrologer who assured the public that Monsieur de Gassendi, who did so much for the understanding against judicial astrology, would die toward the end of July or at the beginning of August, 1650, and^h who had the shame to see that Gassendi then found himself cured of his illness, on which the prediction apparently relied much more than on the capacity of stars.

a. M. Bernier, *Relat. du Mogol*.

b. See M. Petit, *Dissertation sur les Cometes*, 95.

c. 2.25.

d. Astraea Virgo, siderum magnum decus. ["Astraea Virgo, the great beauty of the stars."] Seneca *Octavia* 425.

e. Haec serio quemquam dixisse, summa hominum contentio est, et intoleranda mendaciorum impunitas. Pliny 37. 2.

f. Toties taurum non ferire, difficile est. ["To fail to strike a bull many times is difficult."] Trebellius Pollio *Lives of the Gallieni*.

g. Venaturque aliturque avibus volucresque petendo, Debita Trojanis exercet spicula fatis. ["He hunts and is fed by birds, and in pursuit of birds uses those arrows which fate intended for Troy."] Ovid *Metamorphoses* 13.

h. Jean-Baptiste Morin. See Bernier, *Abrégé de la Philosophie de Gassendi* Vol. 4, p. 489.

On the Belief in Astrology among the Ancient Pagans

But it would not be pointless to show that while astrology may be the vainest of all impostors, it has not failed to establish for itself a kind of dominion in the world. It seems in several passages of Scripture^a that the court of the kings of Babylon was full of astrologers who scattered their predictions everywhere and flattered their nation with a thousand deceptive expectations. There were many in Egypt as well. They

so infatuated the city of Rome that the authority of the prince had to check this great abuse. But the order for their banishment was so badly executed that this negligence led an historian to say that “astrologers will always be chased away and they will always be retained.”^b Not but that the falsity of their predictions should have discredited them sufficiently, for the Emperor Claudius alone, whom they threatened incessantly with the fatal hour, caused them to lie so many times that Seneca^c presented Mercury praying to Fate to be willing to allow the astrologers finally to say the truth. But what do you want? Men love to be deluded, and for that they easily forget the blunders of the astrologers and remember only the occasions when their predictions were taken to be true.

This is what has been very well noted by Henri le Grand. A year did not go by, or a month, in which the astrologers did not announce the terrible threat of his death. “They shall finally speak the truth (this prince said one day) and the public will better remember the one time their predication will have been true than so many others when they predicted falsely.” This is also what someone noted as regards the oracles of Delphi. Those that had predicted the truth were learned by heart and spoken of everywhere, but those that had predicted the contrary were forgotten, or rather passed over in silence, for on every occasion the partisans of Apollo made much of the few oracles in which he had not been mistaken and said not a word of the great number of his false prophecies. As for those who scorned oracles, they were not concerned to speak of either the true ones or the false, apart from a small number of persons who were perhaps of the temper of an illustrious Greek philosopher named Oenomanus who, having been deceived often by Apollo’s replies, made,^d out of spite, a very ample compilation of his oracles, the stupidities and falsehoods of which he refuted. Such being the mind of man, one must not find it strange that astrologers held out against the orders given from time to time to chase them away and against their own poor execution of their duties when they predicted things that did not happen. One must be astonished, rather, that the human mind is so weak as to let itself be deceived by people who deceive themselves every day, and it is this that appeared very astonishing to an illustrious Roman,^e who had seen come to pass, for Pompey, Crassus, and Caesar, quite the contrary of what the astrologers had predicted for them. How few are the people who make this decent man’s reflection, who thanked the beautiful Daphne for having delivered him from the superstition of the oracles of Apollo by making the amorous enterprises of this god fail, who boasted so much of knowing the future! But let us leave aside all these moral lessons and content ourselves with saying that pagan antiquity had strangely allowed itself to be made the plaything of astrologers.

a. Isaiah 44 and 47.

b. Genus hominum potentibus infidum, sperantibus fallax, quod in civitate nostra et vetabitur semper et retinebitur. Tacitus *History* 1.

c. Patere mathematicos aliquando verum dicere, qui illum postquam Princeps factus est, omnibus annis, omnibus mensibus, efferunt. [“Let the astrologers finally tell the truth, those who, since he became emperor, have been carrying him out for burial every month, every year.”] Seneca *De Morte Claud. Caesar.* *Copyrighted Material*

d. Eusebius *Praeparat. Evangel.* 5. 10.

e. Quam multa ego Pompeio, quam multa Crasso, quam multa huic ipsi Caesari a Chaldaeis dicta memini, neminem eorum nisi senectute, nisi domi, nisi cum claritate esse moriturum: ut mihi permirum videatur, quemquam exstare qui etiam nunc credat iis quorum praedicta quotidie videat re et eventis refelli. ["I recall many things said by the Chaldeans to Pompey, to Crassus, and even to Caesar himself, that none of them would die except in old age, at home, and with the greatest glory. Thus it would seem very strange to me if there is anyone who, still today, believes in those whose predictions are daily refuted by the events themselves."] Cicero *De Divinatione* 2.

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On the Belief in Astrology among the Infidels of Today

The Mohammedans and pagans of today do still worse. Monsieur Bernier^a assures us in his curious *Relation des États du grand Mogul*, that the greater part of the Asiatics are so infatuated with judicial astrology that they consult astrologers in all their enterprises. When two armies are ready to give battle, they keep from fighting until the astrologer takes and determines the propitious moment to begin combat. Thus, when it is a matter of choosing an army general, despatching an ambassador, concluding a marriage, beginning a voyage, or doing the slightest thing, like buying a slave and wearing a new suit of clothes, none of this can be done without the order of Monsieur Astrologer.

The voyages of Monsieur Tavernier¹ teach us much the same things concerning the Persians, that in general they hold astrologers to be illustrious people; that they consult them as oracles; that the king always has three or four of them before him to tell him the good or bad hour; that every year in Persia an almanac is sold full of predictions concerning wars, illnesses, and scarcity, with remarks on the times that are good to be bled, to be purged, to travel, to dress oneself in new clothes, and other things of this nature; that the Persians give entire credence to this almanac, such that whoever can have one governs himself in all things according to its rules. This goes so far that, in the year 1667,^b the king of Persia, Cha-Sepi II by name, being unable to restore his health by means of the entire industry of his physicians, believed that the astrologers were to blame because they had not been able to ascertain the favorable hour when he had been elevated to the throne. And thereupon this was to be done over again, for once the physicians and the astrologers had agreed upon a propitious hour together, they did not fail to redo all the ceremonies of the coronation, and it was even found appropriate to change the king's name. The court physicians were the principal cause of this whole comedy because, fearing the disgrace some of their body were already in, they thought of justifying medicine at the expense of astrology and of making assurances that the king's illness and the want then afflicting the kingdom were the fault of the astrologers, which they offered to prove, claiming to be as clever as they at knowing the future. Their proposition having pleased the king and his council, a new consultation with the astrologers and physicians was ordered to find a fa-