Discourse on the Method

RENÉ DESCARTES

1596–1650

Discourse on the Method

Discours de la méthode

Translated from the French with AI (Claude) and edited



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Discourse on the Method · René Descartes (1596–1650)

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INTRODUCTION

In 1637 René Descartes published, in French rather than Latin and without his name on the title page, a short account of how he had learned to think. It was written as a preface to three scientific essays, on optics, meteorology and geometry, and it tells the story of his own education, his doubts about everything he had been taught, and the method he worked out to replace it.

This is where "I think, therefore I am" first appears. Descartes presents it not as a clever argument but as the one truth that survived his decision to reject anything he could possibly doubt. From it he goes on to God, to the physical world, to the circulation of the blood, and to the difference between human beings and machines.

The book is divided into six parts, and Descartes himself suggests reading them one at a time.

Part One

Various considerations touching the sciences
Descartes recalls his schooling and why nothing he learned satisfied him.

THE AUTHOR'S NOTE ON THE SIX PARTS

[1] *If this discourse seems too long to be read all at once, it may be divided into six parts. In the first you will find various considerations concerning the sciences. In the second, the principal rules of the method the author has sought. In the third, some of the rules of the morality he has drawn from this method. In the fourth, the reasons by which he proves the existence of God and of the human soul, which are the foundations of his metaphysics. In the fifth, the order of the questions in physics that he has investigated, and in particular the explanation of the movement of the heart and of some other difficulties that belong to medicine; and then also the difference between our soul and that of animals. And in the last, what things he believes are required in order to advance further in the investigation of nature than he has done, and what reasons have led him to write.*

Good sense is the most fairly distributed thing in the world: for everyone thinks himself so well provided with it that [2] even those who are the hardest to satisfy in everything else do not usually want more of it than they have.[1] It is not likely that everyone is mistaken about this. Rather, it shows that the power of judging well and of distinguishing the true from the false—which is properly what is called good sense or reason—is natur-

1 "Good sense" (*bon sens*): as the next sentence explains, Descartes means the power of judging well and telling true from false, which he equates with reason.

ally equal in all people; and so the diversity of our opinions does not come from some being more reasonable than others, but only from our directing our thoughts along different paths and not considering the same things. For it is not enough to have a good mind; the main thing is to apply it well. The greatest souls are capable of the greatest vices as well as of the greatest virtues; and those who walk only very slowly can make much more progress, if they always keep to the straight road, than those who run and stray from it.

For my part, I have never presumed that my mind was in any way more perfect than those of ordinary people. Indeed, I have often wished that I had thought as quick, or imagination as clear and distinct, or memory as ample or as ready, as some others have. And I know of no qualities other than these that serve to perfect the mind. For as to reason, or sense, inasmuch as it is the only thing that makes us human and distinguishes us from the animals, I am willing to believe that it is complete in each one of us. In this I follow the common opinion of the philosophers, who say that there are degrees of more and less only among [3] *accidents*, and not among the *forms*, or natures, of *individuals* of the same *species*.[2]

But I will not be afraid to say that I think I have been very fortunate to have found myself, from my youth, on certain paths that led me to considerations and maxims from which I have formed a method. By means of it, it seems to me, I have a way to increase my knowledge by degrees and to raise it, little by little, to the highest point that the mediocrity of my mind and the short span of my life will allow it to reach. For I have already reaped such fruits from it that, although in the judgments I make about myself I always try to lean toward distrust rather than toward presumption, and although, when I look with a philosopher's eye at the various actions and undertakings of all people, there is hardly one that does not seem to me vain and

2 The vocabulary of scholastic philosophy: a thing's "form" is its essential nature, while "accidents" are features it can have more or less of, or lack, without ceasing to be what it is.

useless, I nevertheless take the greatest satisfaction in the progress I think I have already made in the search for truth. And I form such hopes for the future that if, among the occupations of human beings as purely human, there is any one that is solidly good and important, I dare to believe that it is the one I have chosen.

Yet it may be that I am mistaken, and that what I take for gold and diamonds is perhaps only a little copper and glass. I know how liable we are to err in matters that concern ourselves, and how suspect, too, the judgments of our friends must be to us when they are in our favor. But I will be very glad to show, in this [4] discourse, what paths I have followed, and to depict my life in it as in a painting, so that everyone may judge it. Then, learning from common report the opinions people have of it, I will have a new means of instructing myself, to add to those I am accustomed to use.

Thus my purpose here is not to teach the method that everyone must follow in order to conduct his reason well, but only to show in what way I have tried to conduct my own. Those who take it upon themselves to give precepts must think themselves more skillful than those to whom they give them, and if they fall short in the slightest thing, they are to blame. But since I am offering this writing only as a story—or, if you prefer, as a fable—in which, among some examples one may imitate, one will perhaps also find several others that one would be right not to follow, I hope it will be useful to some without being harmful to anyone, and that all will be grateful to me for my frankness.

A DISAPPOINTING EDUCATION

Descartes recalls his schooling and weighs what each subject taught him, finding none of it certain.

I was brought up on letters from my childhood, and because I was persuaded that by means of them one could acquire a clear and assured knowledge of everything useful in life, I had an intense desire to learn them. But as soon as I had completed the

whole course of study at the end of which one is usually admitted to the ranks of the learned, I changed my opinion entirely. For I found myself entangled in so many doubts and errors that it seemed to me I had gained nothing from trying to educate myself, except that I had discovered more and more of my own ignorance.[3] And yet [5] I was at one of the most celebrated schools in Europe, where I thought there must be learned men if there were any anywhere on earth. I had learned there everything the others learned; and indeed, not content with the sciences we were taught, I had gone through all the books that had come into my hands dealing with those sciences considered the most curious and the rarest. Besides that, I knew the judgments others made of me, and I did not see that I was considered inferior to my fellow students, even though there were already some among them who were destined to fill our teachers' places.[4] And finally, our age seemed to me as flourishing, and as fertile in good minds, as any before it. This led me to take the liberty of judging all others by myself, and of thinking that there was no body of learning in the world such as I had previously been led to hope for.

I did not, however, cease to value the exercises with which the schools are occupied. I knew that the languages learned there are necessary for understanding the books of the ancients; that the charm of fables awakens the mind; that the memorable deeds recorded in histories elevate it, and that, read with discernment, they help to form the judgment; that reading all good books is like a conversation with the finest people of past centuries, who were their authors—indeed a studied conversation, in which they reveal to us only the best of their thoughts; that eloquence has incomparable power and beauty; that poetry has [6] most ravishing delicacy and sweetness; that mathematics contains very subtle inventions, which can do much to satisfy the

3 "Letters" (*lettres*): the humanistic curriculum of languages, literature, history and philosophy.

4 The Jesuit college of La Flèche in Anjou, which Descartes attended from about 1607 to 1615.

curious as well as to further all the arts and lessen human labor; that writings dealing with morals contain many teachings and many exhortations to virtue that are very useful; that theology teaches how to gain heaven; that philosophy provides the means to speak plausibly about all things and to win the admiration of the less learned; that law, medicine and the other sciences bring honors and riches to those who cultivate them; and finally, that it is good to have examined them all, even the most superstitious and the most false, in order to know their true worth and guard against being deceived by them.

But I believed I had already given enough time to languages, and also to reading the books of the ancients, their histories and their fables. For conversing with those of other centuries is almost the same as traveling. It is good to know something of the customs of various peoples, so as to judge our own more soundly, and not to think that everything contrary to our ways is ridiculous and against reason, as those who have seen nothing usually do. But when one spends too much time traveling, one ends up a stranger in one's own country; and when one is too curious about things practiced in past centuries, one usually remains quite ignorant of those practiced in this one. Besides, fables make us imagine many [7] events as possible that are not. And even the most faithful histories, if they do not alter or exaggerate the importance of things to make them more worth reading, at least almost always omit the humblest and least illustrious circumstances. As a result, the rest does not appear as it is, and those who govern their conduct by the examples they draw from them are liable to fall into the extravagances of the knights-errant of our romances, and to conceive plans beyond their powers.[5]

I held eloquence in high esteem, and I was in love with poetry; but I thought both were gifts of the mind rather than fruits of study. Those who reason most powerfully, and who best digest their thoughts to make them clear and intelligible, can

5 "Knights-errant" renders *Paladins*, the heroes of chivalric romance such as the Charlemagne cycle and *Amadis of Gaul*.

always best persuade others of what they propose, even if they spoke only Low Breton and had never learned rhetoric. And those who have the most pleasing inventions and know how to express them with the most ornament and sweetness would still be the best poets, even if the art of poetry were unknown to them.[6]

Above all I delighted in mathematics, because of the certainty and evidence of its reasonings; but I did not yet see its true use. Thinking that it served only the mechanical arts, I was astonished that, its foundations being so firm and solid, nothing more elevated had been built on them. By contrast, I compared the writings of the ancient pagans that deal with morals to very proud and [8] magnificent palaces built only on sand and mud. They exalt the virtues very highly, and make them appear worthy of esteem above everything else in the world; but they do not teach enough about how to recognize them, and often what they call by so fine a name is nothing but insensibility, or pride, or despair, or parricide.[7]

I revered our theology, and aspired as much as anyone to gain heaven. But having learned, as something quite certain, that the road to it is no less open to the most ignorant than to the most learned, and that the revealed truths that lead there are beyond our understanding, I would not have dared to submit them to the weakness of my reasonings; and I thought that to undertake to examine them, and to succeed, one would need some extraordinary assistance from heaven, and to be more than human.

I will say nothing of philosophy except this. I saw that it had been cultivated by the most excellent minds that have lived for many centuries, and that nevertheless there is still nothing in it that is not disputed and consequently not doubtful; so I was not presumptuous enough to hope to fare better in it than others.

6 Low Breton: the Celtic language of western Brittany, which Descartes's readers would have regarded as a rustic dialect.

7 Perhaps allusions to Stoic impassivity, Cato's suicide, and Brutus's killing of Caesar (or Timoleon's of his brother), all praised by ancient moralists.

And considering how many different opinions there can be on one and the same matter, all upheld by learned people, while there can never be more than one that is true, I regarded as good as false everything that was merely probable.

Then, as for the other sciences, inasmuch as they borrow their principles from philosophy, I judged [9] that nothing solid could have been built on foundations so unsteady. And neither the honor nor the profit they promise was enough to induce me to learn them; for I did not feel myself, thank God, in any condition that obliged me to make a trade of learning to relieve my fortune. And although I did not make a profession of despising glory, like a Cynic, I nevertheless set very little store by the kind of glory I could hope to acquire only under false pretenses.[8] And finally, as for the bad doctrines, I thought I already knew well enough what they were worth that I was no longer liable to be deceived either by the promises of an alchemist, or by the predictions of an astrologer, or by the impostures of a magician, or by the tricks or boasting of any of those who profess to know more than they do.

THE GREAT BOOK OF THE WORLD

Leaving his books, Descartes travels to learn from the world and then resolves to study himself.

That is why, as soon as age allowed me to leave the control of my teachers, I entirely abandoned the study of letters. Resolving to seek no knowledge other than what could be found in myself, or else in the great book of the world, I spent the rest of my youth traveling, seeing courts and armies, mixing with people of various temperaments and ranks, gathering various experiences, testing myself in the situations that fortune offered me, and everywhere reflecting on whatever came before me so as to derive some profit from it. For it seemed to me that I could find much more truth in the reasonings each person makes about

8 The Cynics, followers of Diogenes of Sinope (4th century BC), made a show of scorning reputation and social convention.

matters that concern him, and whose outcome [10] will soon punish him if he has judged badly, than in those a scholar makes in his study about speculations that produce no effect and have no consequence for him—except perhaps that he will take all the more pride in them the further they are from common sense, since he will have had to use all the more wit and skill in trying to make them plausible. And I always had an intense desire to learn to distinguish the true from the false, in order to see clearly in my actions and walk with assurance in this life.

It is true that, while I was merely observing the customs of other people, I found hardly anything in them to make me certain, and I noticed almost as much diversity among them as I had earlier among the opinions of the philosophers. So the greatest profit I drew from it was this: seeing many things that, although they seem to us very extravagant and ridiculous, are nevertheless commonly accepted and approved by other great peoples, I learned not to believe too firmly anything I had been persuaded of only by example and custom. And thus I gradually freed myself from many errors that can obscure our natural light and make us less able to listen to reason.[9] But after I had spent some years studying in this way in the book of the world, and trying to gain some experience, I resolved one day to study within myself as well, and to use all the powers of my mind in choosing the paths I ought to follow. In this I succeeded much [11] better, it seems to me, than if I had never left either my country or my books.

9 "Natural light": Descartes's term for our innate power of knowing, as in the *Meditations*.

Part Two

The principal rules of the method
Shut in a stove-heated room, Descartes resolves to rebuild his beliefs and sets out four rules.

I was then in Germany, where I had been drawn by the wars that are not yet over there. As I was returning to the army from the Emperor's coronation, the onset of winter held me up in quarters where, finding no conversation to divert me, and having besides, by good fortune, no cares or passions to trouble me, I stayed all day shut up alone in a stove-heated room, where I had all the leisure in the world to converse with my own thoughts. Among them, one of the first was that I took it into my head to consider that there is often less perfection in works composed of several parts and made by the hands of various masters than in those on which one person alone has worked.[1] Thus we see that buildings undertaken and completed by a single architect are usually more beautiful and better ordered than those that several people have tried to patch up, making use of old walls that had been built for other purposes. Thus, too, those ancient cities that began as mere villages and became great towns in the course of time are usually so badly laid out, compared with the regular places an engineer traces on a plain as he pleases, that—although, considering their buildings one by one, one often finds as much art in them as in those of other towns, or more—yet seeing how they are arranged, a large one here, a small one there, and how they make the streets crooked and uneven, one [12]

1 The Thirty Years' War (1618–48). Descartes had attended the coronation of Emperor Ferdinand II at Frankfurt in 1619 and spent that winter near Ulm.

would say that it was chance, rather than the will of some people using reason, that arranged them so. And if we consider that there have nevertheless always been officials charged with overseeing private buildings so as to make them serve as ornaments to the public, we will readily see that it is hard to make things very accomplished by working only on the works of others. Thus I imagined that peoples who once lived in a simpler state, and who took up civil life only little by little, making their laws only as the nuisance of crimes and quarrels forced them to, could not be as well ordered as those who, from the moment they first came together, observed the constitutions of some wise lawgiver. Just as it is quite certain that the state of the true religion, whose ordinances God alone has made, must be incomparably better regulated than all the others. And, to speak of human things, I believe that if Sparta was once very flourishing, this was not because of the goodness of each of its laws in particular—seeing that many were very strange, and even contrary to good morals—but because, having been devised by one man alone, they all tended toward the same end.[2] And so I thought that the sciences found in books—at least those whose reasonings are only probable and which have no demonstrations—having been composed and swollen little by little from the opinions of many different people, do not come as close to the truth as the simple reasonings that a person [13] of good sense can naturally make about the things that present themselves. And so, again, I thought that since we have all been children before being adults, and for a long time had to be governed by our appetites and our teachers—which were often contrary to one another, and neither of which perhaps always advised us for the best—it is almost impossible that our judgments should be as pure or as solid as they would have been had we had the full use of our reason from the moment of our birth, and had we never been guided by anything but reason.

It is true that we do not see all the houses of a town being torn down for the sole purpose of rebuilding them in another fashion

2 Sparta's laws were traditionally ascribed to the single lawgiver Lycurgus.

and making the streets more beautiful. But we do see many people having their own houses pulled down in order to rebuild them, and even being forced to at times, when the houses are in danger of falling down by themselves and their foundations are not very firm. Following this example, I convinced myself that there would truly be no sense in a private individual planning to reform a State by changing everything in it from the foundations up and overturning it in order to set it right again—nor even to reform the body of the sciences, or the order established in the schools for teaching them. But as for all the opinions I had accepted into my belief up to then, I could do no better than to undertake, once and for all, to remove them, so as to put back afterward either other, better ones, or else the same ones, once I had [14] brought them into line with reason. And I firmly believed that by this means I would succeed in conducting my life much better than if I built only on old foundations and relied only on the principles I had allowed myself to be persuaded of in my youth, without ever having examined whether they were true. For although I noticed various difficulties in this, they were not without remedy, nor comparable to those found in reforming the least things that affect the public. Those great bodies are too hard to raise up again once they have been thrown down, or even to hold up once they have been shaken, and their falls can only be very violent. Then, as for their imperfections, if they have any—and the mere diversity among them is enough to assure us that many do—use has no doubt greatly softened them; it has even imperceptibly avoided or corrected a great many that could not be provided for so well by foresight. And finally, they are almost always more bearable than changing them would be, in the same way that the main roads winding among mountains become, little by little, so smooth and convenient through being traveled that it is much better to follow them than to try to go more directly by climbing over rocks and descending to the bottom of precipices.

That is why I cannot at all approve of those meddlesome and restless temperaments who, though called neither by birth nor

by fortune to the management of public affairs, are nevertheless always devising, in their heads, some new [15] reform. And if I thought there were the slightest thing in this writing that could make anyone suspect me of such folly, I would be very sorry to allow it to be published. My plan has never gone further than trying to reform my own thoughts and to build on a foundation that is entirely my own. If, having been rather pleased with my work, I show you the model of it here, it is not because I want to advise anyone to imitate it. Those whom God has better endowed with his graces will perhaps have loftier plans; but I fear that this one may already be too bold for many. The mere resolution to rid oneself of all the opinions one has previously accepted into one's belief is not an example that everyone should follow. And the world is made up almost entirely of two kinds of minds to whom it is not at all suited. Namely, those who, believing themselves cleverer than they are, cannot keep from rushing their judgments, nor have enough patience to conduct all their thoughts in order. As a result, if they had once taken the liberty of doubting the principles they had accepted and of leaving the common road, they would never be able to keep to the path one must take to go more directly, and would remain lost all their lives. Then, those who, having enough reason or modesty to judge that they are less capable of distinguishing the true from the false than certain others by whom they can be taught, ought much rather to be content to follow those others' opinions than to seek better ones themselves.

[16] As for me, I would no doubt have been one of these latter, if I had only ever had a single teacher, or if I had not known the differences that have always existed among the opinions of the most learned. But I had learned, as early as my school days, that one cannot imagine anything so strange and so unbelievable that it has not been said by one philosopher or another. Since then, in my travels, I had recognized that all those whose views are very contrary to ours are not, for that reason, any less civilized than we are, but that many of them make as much use of reason as we do, or more. And I had considered how one and the

same person, with the same mind, brought up from childhood among the French or the Germans, becomes different from what he would be if he had always lived among the Chinese or the peoples of Brazil;[3] and how, even in the fashions of our clothes, the same thing that pleased us ten years ago, and that will perhaps please us again before ten more years are out, now seems to us extravagant and ridiculous. So it is much more custom and example that persuade us than any certain knowledge; and yet a majority of voices is no proof worth anything for truths that are somewhat hard to discover, because it is much more likely that one person alone has hit on them than a whole people. For all these reasons, I could not choose anyone whose opinions seemed to me preferable to those of others, and I found myself, as it were, forced to undertake to guide myself.

But like a man who walks alone and in the dark, I resolved to go so slowly, and to use [17] such caution in all things, that even if I advanced only very little, I would at least take good care not to fall. I did not even want to begin rejecting entirely any of the opinions that might once have slipped into my belief without having been introduced there by reason, until I had first spent enough time planning the work I was undertaking, and seeking the true method for arriving at the knowledge of everything of which my mind would be capable.

FOUR RULES OF METHOD

Finding logic, geometry and algebra wanting, Descartes adopts four simple rules for directing his thinking.

When I was younger I had studied a little, among the branches of philosophy, logic, and among those of mathematics, geometrical analysis and algebra—three arts or sciences that seemed as if they ought to contribute something to my plan. But on examining them, I noticed that, as for logic, its syllogisms and most of its other teachings serve rather to explain to others the

3 Descartes writes *Canibales*, the name then given to the Tupinambá of Brazil, made famous in France by Montaigne's essay "Of Cannibals" (1580).

things one already knows—or even, like the art of Lull, to speak without judgment about those one does not know—than to learn them.[4] And although it does in fact contain many very true and very good precepts, there are nevertheless so many others mixed in with them that are either harmful or superfluous that it is almost as hard to separate them as to draw a Diana or a Minerva out of a block of marble that has not yet even been roughed out. Then, as for the analysis of the ancients and the algebra of the moderns: besides the fact that they extend only to very abstract matters that seem to be of no use, the former is always so tied to the consideration of figures that it cannot exercise [18] the intellect without greatly tiring the imagination; and in the latter, people have so subjected themselves to certain rules and certain symbols that they have made of it a confused and obscure art that encumbers the mind, instead of a science that cultivates it. This is why I thought I had to seek some other method which, while combining the advantages of these three, would be free of their defects. And just as a multitude of laws often furnishes excuses for vices, so that a State is much better governed when it has very few laws and they are very strictly observed, so, in place of the great number of precepts of which logic is composed, I believed that the following four would be enough for me, provided I made a firm and constant resolution never once to fail to observe them.

The first was never to accept anything as true that I did not know evidently to be so: that is, carefully to avoid precipitation and prejudice, and to include nothing more in my judgments than what presented itself so clearly and so distinctly to my mind that I had no occasion to call it into doubt.[5]

The second, to divide each of the difficulties I examined into as many parts as possible, and as might be required to resolve them better.

4 Ramon Llull (c. 1232–1316), Catalan philosopher, whose "Great Art" combined terms mechanically to generate propositions on any subject.
5 "Precipitation" is judging too hastily; "prejudice" (*prévention*) is judging on the basis of opinions formed beforehand.

The third, to conduct my thoughts in order, beginning with the simplest objects and the easiest to know, so as to rise little by little, as if by steps, to the knowledge of the most composite; and even supposing an order among those [19] that do not naturally precede one another.

And the last, to make enumerations so complete, and reviews so comprehensive, everywhere, that I would be sure of leaving nothing out.

Those long chains of reasonings, all simple and easy, which geometers customarily use to reach their most difficult demonstrations, had given me occasion to imagine that all the things that can fall within human knowledge follow from one another in the same way. And I imagined that, provided only that one refrains from accepting any of them as true that is not, and that one always keeps the order needed to deduce them from one another, there can be none so remote that one cannot eventually reach it, nor so hidden that one cannot discover it. Nor was I much at a loss to find which ones I needed to begin with: for I already knew that it was with the simplest and easiest to know. And considering that, among all those who have hitherto sought truth in the sciences, only the mathematicians have been able to find any demonstrations—that is, any certain and evident reasons—I did not doubt that I should begin with the same things they examined, although I expected no other benefit from them than that they would accustom my mind to feed on truths and not to be content with false reasons. But I did not intend, for all that, to try to learn all those particular sciences commonly called mathematics. [20] Seeing that, although their objects are different, they nevertheless all agree in considering nothing in them but the various relations or proportions found there, I thought it better to examine only these proportions in general, supposing them only in subjects that would serve to make knowing them easier for me—yet without restricting them to those subjects in any way, so as to be able to apply them all the better afterward to all the others to which they might apply. Then, having noticed that in order to know them I would some-

times need to consider each one separately, and sometimes only to keep them in mind, or to grasp several of them together, I thought that, to consider them better separately, I ought to suppose them in lines, because I found nothing simpler, nor anything I could represent more distinctly to my imagination and my senses. But to keep them in mind, or to grasp several together, I had to express them by certain symbols, as short as possible. And by this means I would borrow all the best of geometrical analysis and of algebra, and correct all the defects of the one by the other.[6]

And in fact, I dare say that the exact observance of these few precepts I had chosen gave me such ease in unraveling all the questions to which these two sciences extend that, in the two or three months I spent examining them—having begun with the simplest and most general, and each truth I found being a rule that [21] then helped me find others—not only did I succeed with many that I had once judged very difficult, but it also seemed to me, toward the end, that I could determine, even in those I did not know, by what means and how far it was possible to solve them. In this I will perhaps not seem to you very vain, if you consider that, since there is only one truth about each thing, whoever finds it knows as much about it as can be known. For example, a child who has been taught arithmetic and has done an addition according to its rules can be sure of having found, concerning the sum he was examining, everything that the human mind could find. For, after all, the method that teaches us to follow the true order, and to enumerate exactly all the circumstances of what we are seeking, contains everything that gives certainty to the rules of arithmetic.

But what pleased me most about this method was that by it I was assured of using my reason in everything, if not perfectly, at least as well as was in my power. Besides, I felt, in practicing it, that my mind was gradually growing accustomed to conceiving its objects more clearly and more distinctly; and since I had not

6 This is the program of Descartes's *Geometry*, published with the *Discourse*, which founded analytic geometry by expressing curves through algebraic equations.

tied the method to any particular subject matter, I promised myself that I would apply it as usefully to the difficulties of the other sciences as I had to those of algebra. Not that I dared, for all that, to undertake right away to examine all those that presented themselves; for that itself would have been contrary to the order it prescribes. But having noticed that their principles must all be borrowed from [22] philosophy, in which I still found none that were certain, I thought that above all I must try to establish some there. And since this was the most important thing in the world, and the one where precipitation and prejudice were most to be feared, I thought I ought not to undertake to accomplish it until I had reached a much more mature age than the twenty-three I then was, and until I had first spent a long time preparing for it—both by uprooting from my mind all the bad opinions I had accepted before that time, and by amassing many experiences to serve afterward as the material of my reasonings, and by constantly practicing the method I had prescribed for myself, so as to become more and more firmly grounded in it.

Part Three

Some rules of morals drawn from the method
A provisional moral code to live by while everything else is in doubt.

And finally, before beginning to rebuild the house one lives in, it is not enough to pull it down, to lay in materials and architects (or to train oneself in architecture), and, besides that, to have carefully drawn up the plan for it; one must also have provided oneself with some other house where one can be comfortably lodged while the work is going on. In the same way, so that I would not remain irresolute in my actions while reason obliged me to be so in my judgments, and so that I could still live as happily as possible from then on, I formed for myself a provisional morality, consisting of only three or four maxims, which I am glad to share with you.[1]

The first was to obey the laws and [23] customs of my country, holding constantly to the religion in which God has given me the grace to be instructed since my childhood, and governing myself in everything else according to the most moderate opinions, those furthest from excess, that were commonly accepted in practice by the most sensible of the people with whom I would have to live. For since I was beginning from then on to count my own opinions as nothing, because I wanted to submit them all to examination, I was sure I could do no better than to follow those of the most sensible people. And although there may perhaps be people just as sensible among the Persians or

1 "Provisional morality" (*morale par provision*): a code of conduct to live by in the meantime, while all his beliefs are under review.

the Chinese as among us, it seemed to me that the most useful course was to regulate myself by those with whom I would have to live; and that, to know what their opinions really were, I ought to pay attention to what they did rather than to what they said. This was not only because, in the corruption of our morals, few people are willing to say everything they believe, but also because many do not know it themselves. For the act of thought by which we believe a thing is different from the act by which we know that we believe it, and so the one often occurs without the other. And among several opinions equally accepted, I chose only the most moderate: both because these are always the most convenient in practice, and probably the best, since all excess is usually bad; and also so that, if I went wrong, I would stray less far from the true path than if I had chosen one of the extremes when it was the other that I should have followed. And, [24] in particular, I counted as excesses all the promises by which one gives up some part of one's freedom. Not that I disapproved of the laws which, to remedy the inconstancy of weak minds, allow people to make vows or contracts that oblige them to persevere —when they have some good purpose, or even, for the security of commerce, a purpose that is merely indifferent. But because I saw nothing in the world that always remained in the same state, and because, for my own part, I promised myself to make my judgments more and more perfect, and not to make them worse, I would have thought I was committing a serious error against good sense if, because I approved of something at that time, I had bound myself to take it as good later on too, when it had perhaps ceased to be so, or when I had ceased to regard it as such.

My second maxim was to be as firm and resolute in my actions as I could, and to follow even the most doubtful opinions, once I had decided on them, no less constantly than if they had been completely certain. In this I imitated travelers who, finding themselves lost in some forest, should not wander about turning this way and that, still less stay in one place, but should always walk as straight as they can in one direction, and not

change it for weak reasons, even if at the outset it was perhaps chance alone that made them choose it. For in this way, even if they do not arrive exactly where they want to go, they will [25] at least end up somewhere in the end, where they will probably be better off than in the middle of a forest. And so, since the actions of life often allow no delay, it is a very certain truth that when it is not in our power to discern the truest opinions, we must follow the most probable. And even when we notice no more probability in some than in others, we must nevertheless settle on some of them, and afterward regard them no longer as doubtful, insofar as they bear on practice, but as very true and very certain, because the reason that made us settle on them is itself true and certain. And this was enough, from then on, to free me from all the regrets and remorse that usually trouble the consciences of those weak and wavering minds who inconstantly allow themselves to act on things as good which they later judge to be bad.

My third maxim was always to try to master myself rather than fortune, and to change my desires rather than the order of the world; and in general, to accustom myself to believing that there is nothing entirely in our power except our thoughts, so that, after we have done our best regarding things outside us, whatever we fail to achieve is, as far as we are concerned, absolutely impossible. And this alone seemed to me enough to keep me from desiring anything in future that I would not obtain, and so to make me content. For since our will naturally tends to [26] desire only the things that our intellect represents to it as in some way possible, it is certain that if we consider all the goods outside us as equally beyond our power, we will have no more regret at lacking those that seem due to us by birth, when we are deprived of them through no fault of our own, than we have at not possessing the kingdoms of China or Mexico. And making, as they say, a virtue of necessity, we will no more desire to be healthy when we are ill, or to be free when we are in prison, than we now desire to have bodies made of a matter as incorruptible as diamonds, or wings to fly like the birds. But I admit

that long practice and often repeated meditation are needed to accustom oneself to looking at everything from this angle; and I believe that it was chiefly in this that the secret lay of those philosophers who in former times were able to escape the dominion of Fortune and, despite pain and poverty, to rival their gods in happiness.[2] For by constantly occupying themselves with considering the limits prescribed to them by Nature, they persuaded themselves so completely that nothing was in their power except their thoughts that this alone was enough to prevent them from having any attachment to other things; and they had such absolute control over their thoughts that in this they had some reason to consider themselves richer, and more powerful, and freer, and happier than any other men, who, lacking this philosophy, however [27] favored by Nature and Fortune they may be, never have such control over everything they wish.

Finally, to conclude this morality, I decided to review the various occupations people have in this life, in order to try to choose the best; and without wishing to say anything about the occupations of others, I thought I could do no better than to continue in the very one I was in—that is, to spend my whole life cultivating my reason and advancing as far as I could in the knowledge of the truth, following the method I had prescribed for myself. I had experienced such extreme contentment since I had begun to use this method that I did not believe one could receive any sweeter or more innocent in this life; and as I discovered every day, by its means, some truths that seemed to me fairly important and commonly unknown to other people, the satisfaction I took in them so filled my mind that nothing else affected me. Besides, the three preceding maxims were founded only on the plan I had to go on instructing myself. For since God has given each of us some light to distinguish the true from the false, I would not have thought I ought to be content with other people's opinions for a single moment if I had not intended to

2 Descartes has in mind chiefly the ancient Stoics, who held that the wise man, whatever his circumstances, is as happy as the gods.

use my own judgment to examine them when the time came; and I could not have kept free of scruples in following them if I had not hoped that I would not thereby lose any opportunity of finding better ones, in case there [28] were any. And finally, I could not have limited my desires, or been content, if I had not followed a path by which, thinking I was assured of acquiring all the knowledge of which I would be capable, I thought I was assured by the same means of acquiring all the true goods that would ever be in my power. For since our will tends to pursue or avoid anything only insofar as our intellect represents it as good or bad, it is enough to judge well in order to do well, and to judge as well as one can in order to do one's best as well—that is, to acquire all the virtues, and with them all the other goods one can acquire; and when one is certain that this is so, one cannot fail to be content.

NINE YEARS OF TRAVEL

Descartes spends nine years rooting out errors and practicing his method before settling in the Netherlands.

Having thus assured myself of these maxims, and set them aside along with the truths of faith, which have always been foremost among my beliefs, I judged that as for all the rest of my opinions, I could freely undertake to rid myself of them. And since I hoped to be better able to accomplish this by conversing with people than by remaining any longer shut up in the stove-heated room where I had had all these thoughts, winter was not yet quite over when I set out traveling again. And throughout the following nine years I did nothing but roam here and there in the world, trying to be a spectator rather than an actor in all the comedies played out in it. And reflecting particularly, in each matter, on what could make it doubtful and give us occasion to be mistaken, I meanwhile rooted out of my mind all the errors that had been able to [29] slip into it before. Not that in doing so I imitated the Skeptics, who doubt only for the sake of doubting and affect to be always undecided; for, on the contrary,

my whole aim was only to reach assurance, and to cast aside the shifting earth and sand in order to find rock or clay. In this I succeeded fairly well, it seems to me, since, trying to uncover the falsity or uncertainty of the propositions I examined, not by weak conjectures but by clear and assured reasoning, I encountered none so doubtful that I could not always draw some fairly certain conclusion from it, even if only this: that it contained nothing certain. And just as, when an old house is pulled down, the rubble is usually kept to help build a new one, so, in destroying all those of my opinions that I judged to be ill-founded, I made various observations and gathered much experience, which has since helped me to establish more certain ones. Moreover, I went on practicing the method I had prescribed for myself. For besides taking care to conduct all my thoughts in general according to its rules, I set aside a few hours from time to time, which I spent specifically in applying it to problems in mathematics, or even to some others that I could make almost like those of mathematics by detaching them from all the principles of the other sciences, which I did not find firm enough—as you will see I have done with several that are explained in this volume.[3] And so, while living, to all appearances, no [30] differently from those who, having no occupation but to lead a pleasant and innocent life, take care to separate pleasures from vices, and who, to enjoy their leisure without boredom, engage in every respectable pastime, I nonetheless went on pursuing my plan and making progress in the knowledge of the truth—perhaps more than if I had done nothing but read books or keep company with men of letters.

Nevertheless, those nine years slipped by before I had yet taken any side on the questions usually disputed among the learned, or begun to look for the foundations of any philosophy more certain than the common one. And the example of many excellent minds who had had this plan before and, it seemed to me, had not succeeded, made me imagine so much difficulty in

3 The *Discourse* was published as the preface to three essays in the same volume: the *Optics*, the *Meteorology* and the *Geometry*.

it that I might not yet have dared to undertake it so soon, had I not seen that some people were already spreading the rumor that I had accomplished it. I could not say what they based this opinion on; and if I contributed anything to it by my conversation, it must have been by confessing more candidly what I did not know than those who have studied a little usually do, and perhaps also by showing the reasons I had for doubting many things that others consider certain, rather than by boasting of any doctrine. But having a heart honest enough not to want to be taken for anything other than I was, I thought I must try by every means to make myself worthy of the reputation [31] I was being given. And it is exactly eight years ago that this desire made me resolve to move away from all the places where I might have acquaintances and to withdraw here, to a country where the long duration of the war has led to the establishment of such good order that the armies maintained there seem to serve only to let people enjoy the fruits of peace with all the more security; and where, amid the crowd of a great and very active people, more concerned with their own affairs than curious about other people's, I have been able, without lacking any of the conveniences found in the busiest cities, to live as solitary and withdrawn as in the most remote wildernesses.[4]

4 The Dutch Republic, where Descartes settled in 1628–29; the war is the Dutch struggle for independence from Spain (1568–1648).

Part Four

Proofs of God and the human soul
"I think, therefore I am," and the foundations of his metaphysics.

I do not know whether I ought to tell you about the first meditations I made there; for they are so metaphysical and so out of the ordinary that they will perhaps not be to everyone's taste. And yet, so that people may judge whether the foundations I have laid are firm enough, I find myself in some way compelled to speak of them.

DOUBTING EVERYTHING

Descartes rejects whatever can be doubted and finds that "I think, therefore I am" survives.

I had long since noticed that in matters of conduct it is sometimes necessary to follow opinions one knows to be very uncertain just as if they were beyond doubt, as was said above. But because I then wished to devote myself solely to the search for truth, I thought I had to do the very opposite, and reject as absolutely false everything in which I could imagine the least doubt, in order to see whether, after that, anything would remain among my beliefs that was entirely indubitable. Thus, [32] because our senses sometimes deceive us, I chose to suppose that nothing was such as they make us imagine it. And because there are people who make mistakes in reasoning, even about the simplest matters of geometry, and commit fallacies, I judged that I was as liable to err as anyone else, and I rejected as false

all the reasonings I had previously taken for demonstrations. And finally, considering that all the same thoughts we have when awake can also come to us when we are asleep, without any of them then being true, I resolved to pretend that everything that had ever entered my mind was no more true than the illusions of my dreams. But immediately afterward I noticed that, while I was trying in this way to think that everything was false, it necessarily had to be that I, who was thinking it, was something. And observing that this truth, *I think, therefore I am*, was so firm and so assured that all the most extravagant suppositions of the Skeptics were incapable of shaking it, I judged that I could accept it without scruple as the first principle of the philosophy I was seeking.[1]

Then, examining attentively what I was, and seeing that I could pretend that I had no body, and that there was no world and no place where I was, but that I could not for all that pretend that I did not exist; and that, on the contrary, from the very fact that I was thinking of doubting the truth of other things, it followed very evidently and very certainly that I existed; whereas if I had merely [33] stopped thinking, even if everything else I had ever imagined had been true, I would have had no reason to believe that I existed—I knew from this that I was a substance whose whole essence or nature is simply to think, and which, in order to exist, needs no place and depends on no material thing. So that this 'I'—that is, the soul by which I am what I am—is entirely distinct from the body, and is even easier to know than the body, and even if the body did not exist, the soul would not cease to be all that it is.

After that, I considered in general what is required for a proposition to be true and certain; for since I had just found one that I knew to be so, I thought I ought also to know what this certainty consists in. And having noticed that there is nothing at all in *I think, therefore I am* that assures me I am telling the truth, except that I see very clearly that in order to think one must

1 The famous Latin form, *cogito, ergo sum*, comes later, in the *Principles of Philosophy* and the Latin translation of the *Discourse* (both 1644).

exist, I judged that I could take it as a general rule that the things we conceive very clearly and very distinctly are all true; but that there is some difficulty only in properly discerning which are the ones we conceive distinctly.

THE IDEA OF A PERFECT BEING

Descartes argues that his idea of something more perfect than himself must come from God.

Next, reflecting on the fact that I was doubting, and that consequently my being was not wholly perfect—for I saw clearly that it was a greater perfection to know than to doubt—I decided to look into where I had learned to think of something more perfect than I was; and I knew evidently that it must be [34] from some nature that was in fact more perfect. As for the thoughts I had of many other things outside me, such as the sky, the earth, light, heat and a thousand others, I was not so troubled to know where they came from, because, noticing nothing in them that seemed to make them superior to me, I could believe that, if they were true, they depended on my nature insofar as it had some perfection; and if they were not, that I had them from nothing—that is, that they were in me because I had some defect. But the same could not be true of the idea of a being more perfect than my own. For to have it from nothing was manifestly impossible; and since it is no less contradictory that the more perfect should follow from and depend on the less perfect than that something should come from nothing, I could not have it from myself either. So it remained that it had been put into me by a nature that was truly more perfect than I was, and that even had in itself all the perfections of which I could have any idea—that is, to explain myself in a word, that was God. To this I added that, since I knew some perfections that I did not have, I was not the only being that existed (I will here, if you please, freely use the terms of the Schools), but that there must of necessity be some other, more perfect being, on which I depended and from which I had acquired all that I had. For if I

had been alone and independent of everything else, so that I had had, [35] from myself, all the little I participated in the perfect being, I could for the same reason have had from myself all the rest that I knew I lacked, and thus been myself infinite, eternal, unchanging, all-knowing, all-powerful, and in short have had all the perfections I could observe to be in God.[2] For, following the reasoning I have just gone through, in order to know the nature of God as far as mine was capable of it, I had only to consider, for each of the things of which I found some idea in myself, whether or not it was a perfection to possess it; and I was sure that none of those that indicated some imperfection was in him, but that all the others were. Thus I saw that doubt, inconstancy, sadness and the like could not be in him, seeing that I myself would have been very glad to be free of them. Then, besides that, I had ideas of many sensible and corporeal things. For even though I was supposing that I was dreaming, and that everything I saw or imagined was false, I still could not deny that the ideas of them were truly in my thought. But because I had already recognized very clearly in myself that intelligent nature is distinct from corporeal nature, considering that all composition is evidence of dependence, and that dependence is manifestly a defect, I judged from this that it could not be a perfection in God to be composed of these two natures, and that consequently he was not so composed; but that if there were any bodies in the world, or any intelligences or other natures that were not wholly [36] perfect, their being must depend on his power in such a way that they could not subsist without him for a single moment.

After that I wanted to look for other truths. Taking as my subject the object of the geometers—which I conceived as a continuous body, or a space indefinitely extended in length, width, and height or depth, divisible into various parts, which could have various shapes and sizes and be moved or transposed in all sorts of ways, for the geometers assume all this in their object—I went

2 The Schools: the scholastic philosophy taught in the universities, whose technical terms ("participate", "depend") Descartes borrows here.

through some of their simplest demonstrations. And having noticed that the great certainty everyone attributes to them is founded only on the fact that they are conceived evidently, following the rule I stated a little earlier, I noticed also that there was nothing at all in them that assured me of the existence of their object. For example, I saw clearly that, supposing a triangle, its three angles had to be equal to two right angles; but I saw nothing in this that assured me there was any triangle in the world. Whereas, going back to examine the idea I had of a perfect Being, I found that existence was included in it in the same way that it is included in the idea of a triangle that its three angles are equal to two right angles, or in that of a sphere that all its parts are equally distant from its center, or even more evidently; and that consequently it is at least as certain that God, who is this perfect Being, is or exists, as any geometrical demonstration could be.

[37] But what makes many people persuade themselves that it is difficult to know him, and even to know what their own soul is, is that they never raise their minds beyond sensible things, and are so accustomed to considering nothing except by imagining it—which is a way of thinking peculiar to material things—that whatever is not imaginable seems to them unintelligible. This is clear enough from the fact that even the philosophers in the Schools hold as a maxim that there is nothing in the intellect that was not first in the senses, where, however, it is certain that the ideas of God and of the soul have never been.[3] And it seems to me that those who want to use their imagination to understand these ideas are doing just as if they wanted to use their eyes to hear sounds or smell odors—except that there is this further difference: the sense of sight assures us of the truth of its objects no less than the senses of smell or hearing do, whereas neither our imagination nor our senses could ever assure us of anything unless our intellect intervenes.

Finally, if there are still people who are not sufficiently persuaded of the existence of God and of their soul by the reasons I

have given, I want them to know that all the other things of which they perhaps think themselves more sure—such as having a body, and that there are stars and an earth, and the like—are less certain. For although we have a practical assurance of these things, which is such that it seems [38] that, unless we are being absurd, we cannot doubt them, nevertheless, unless we are being unreasonable, when it is a question of metaphysical certainty we cannot deny that there is sufficient reason for not being entirely sure of them in having noticed that we can, in the same way, imagine while asleep that we have another body and see other stars and another earth, without any of it being so. For how do we know that the thoughts that come to us in dreams are false rather than the others, seeing that they are often no less vivid and sharp?[4] And let the best minds study the matter as much as they like; I do not believe they can give any reason sufficient to remove this doubt unless they presuppose the existence of God. For, first, the very thing I took a little earlier as a rule—namely, that the things we conceive very clearly and very distinctly are all true—is assured only because God is or exists, and is a perfect being, and everything in us comes from him. From which it follows that our ideas or notions, being real things that come from God, cannot, insofar as they are clear and distinct, be anything but true. So that if we quite often have some that contain falsity, these can only be ones that have something confused and obscure about them, because in this respect they partake of nothingness—that is, they are confused in us in this way only because we are not wholly perfect. And it is evident that it is no less contradictory that falsity or [39] imperfection, as such, should come from God, than that truth or perfection should come from nothingness. But if we did not know that everything real and true in us comes from a perfect and infinite

3 The scholastic axiom "Nothing is in the intellect that was not first in the senses," derived from Aristotle.

4 "Practical assurance" renders *assurance morale* (traditionally "moral certainty"): certainty enough for the conduct of life, as opposed to metaphysical certainty, which excludes every possible doubt. Descartes's *moralement* is likewise rendered "practically."

being, then however clear and distinct our ideas might be, we would have no reason to assure us that they had the perfection of being true.

Now, once the knowledge of God and of the soul has thus made us certain of this rule, it is quite easy to see that the dreams we imagine when asleep should in no way make us doubt the truth of the thoughts we have when awake. For if it happened, even in sleep, that someone had some very distinct idea—if, for example, a geometer discovered some new demonstration—his sleep would not prevent it from being true. And as for the most common error of our dreams, which consists in their representing various objects to us in the same way as our external senses do, it does not matter that it gives us occasion to distrust the truth of such ideas, because the senses can also deceive us quite often without our being asleep: as when people who have jaundice see everything colored yellow, or when the stars or other very distant bodies appear to us much smaller than they are. For in the end, whether we are awake or asleep, we should never let ourselves be persuaded except by the evidence of our reason. And it should be noted that I say "of our reason", and not "of our imagination" or "of our senses". For even though we see the [40] sun very clearly, we must not judge from this that it is only as large as we see it; and we can distinctly imagine a lion's head grafted onto a goat's body without having to conclude from this that there is a chimera in the world. For reason does not dictate to us that what we see or imagine in this way is real. But it does dictate to us that all our ideas or notions must have some foundation of truth; for it would not be possible for God, who is wholly perfect and wholly truthful, to have put them in us without one. And since our reasonings are never as evident or as complete during sleep as while we are awake, although our imaginings are sometimes as vivid and sharp then, or more so, reason also tells us that, since our thoughts cannot all be true, because we are not wholly perfect, whatever truth they have must infallibly be found in those we have when awake rather than in our dreams.

Part Five

Questions of physics
The world, the motion of the heart, and the difference between human souls and animals.

I would be very glad to continue, and to show here the whole chain of other truths I have deduced from these first ones. But because, to do so, I would now need to speak of many questions that are in dispute among the learned, with whom I have no wish to quarrel, I think it will be better for me to refrain, and to say only in general what they are, so as to leave it to the wisest to judge whether it would be useful for the public to be informed of them in more detail. I have [41] always remained firm in the resolution I had taken to assume no principle other than the one I have just used to demonstrate the existence of God and of the soul, and to accept nothing as true that did not seem to me clearer and more certain than the demonstrations of the geometers had seemed before. And nevertheless I venture to say that not only have I found a way to satisfy myself in a short time on all the principal difficulties usually treated in philosophy, but also that I have noticed certain laws which God has so established in nature, and of which he has imprinted such notions in our souls, that after reflecting on them sufficiently we could not doubt that they are exactly observed in everything that exists or happens in the world. Then, by considering the sequence of consequences of these laws, I seem to have discovered many truths more useful and more important than anything I had learned before, or even hoped to learn.

THE TREATISE ON THE WORLD

Descartes summarizes his unpublished treatise on light, matter, the heavens and the earth.

But because I have tried to explain the chief among them in a treatise which certain considerations prevent me from publishing, I could not make them known better than by saying here, in summary, what it contains. I intended to include in it everything I thought I knew, before writing it, about the nature of material things.[1] But just as painters, unable to represent equally well on a flat canvas all the different faces of a solid body, choose one of the principal ones to set alone toward the light, and, shading the [42] others, make them appear only as they can be seen when one looks at that one: so, fearing I could not put into my discourse everything I had in mind, I undertook only to set out very fully what I conceived about light; then, on that occasion, to add something about the sun and the fixed stars, because almost all light comes from them; about the heavens, because they transmit it; about the planets, the comets and the Earth, because they reflect it; and in particular about all the bodies on the earth, because they are either colored, or transparent, or luminous; and finally about man, because he is its spectator. Moreover, to shade all these things a little, and to be able to say more freely what I thought about them without being obliged to follow or refute the opinions accepted among the learned, I resolved to leave this whole world here to their disputes, and to speak only of what would happen in a new one, if God were now to create, somewhere in the imaginary spaces, enough matter to compose it, and were to agitate the various parts of this matter in various ways and without order, so as to make of it a chaos as confused as the poets could invent; and if afterward he did nothing but lend his ordinary concurrence to

1 The treatise is *The World* (*Le Monde*), which Descartes withheld in 1633 on learning of Galileo's condemnation; it appeared only after his death, in 1664.

nature, and let it act according to the laws he has established.[2] So, first, I described this matter, and tried to represent it in such a way that there is nothing in the world, it seems to me, clearer or more intelligible, except what was said a little earlier about God and the soul. For I even expressly supposed that [43] there were in it none of those forms or qualities that are disputed in the Schools, nor in general anything the knowledge of which was not so natural to our souls that one could not even pretend to be ignorant of it.[3] Further, I showed what the laws of nature were; and without resting my reasons on any principle other than the infinite perfections of God, I tried to demonstrate all those about which there could have been any doubt, and to show that they are such that, even if God had created many worlds, there could be none in which they failed to be observed. After that, I showed how the greater part of the matter of this chaos must, in consequence of these laws, dispose and arrange itself in a certain way that made it like our heavens; how, meanwhile, some of its parts must compose an earth, some planets and comets, and some others a sun and fixed stars. And here, enlarging on the subject of light, I explained at great length what the light was that must be found in the sun and the stars, how from there it crossed the immense spaces of the heavens in an instant, and how it was reflected from the planets and comets toward the earth. I also added many things about the substance, the position, the motions and all the various qualities of these heavens and these heavenly bodies; so that I thought I had said enough to show that nothing is observed in those of this world that should not, or at least could not, appear exactly the same in those of the world [44] I was describing. From there I went on to speak in particular of the earth: how, even though I had expressly supposed that God had put no heaviness in the matter of which it was composed, all its parts nevertheless tended

2 "Imaginary spaces" was the scholastics' term for the space pictured beyond the created universe. God's "concurrence" (*concours*) is the theologians' term for his ongoing cooperation, without which no created thing could act.

3 The "substantial forms" and "real qualities" of scholastic natural philosophy.

exactly toward its center; how, since there was water and air on its surface, the arrangement of the heavens and the heavenly bodies, chiefly the moon, must cause an ebb and flow there, similar in all its circumstances to that observed in our seas, and in addition a certain current, both of water and of air, from east to west, like the one also observed between the tropics; how mountains, seas, springs and rivers could form there naturally, metals come into the mines, plants grow in the fields, and in general all the bodies called mixed or composite be generated there. And among other things, since after the heavenly bodies I know of nothing in the world except fire that produces light, I set myself to explain very clearly everything that belongs to its nature: how it is made, how it is fed; how it sometimes has only heat without light, and sometimes only light without heat; how it can introduce various colors into various bodies, and various other qualities; how it melts some and hardens others; how it can consume almost all of them, or turn them into ashes and smoke; and finally, how from these ashes, by the sheer violence of its action, it forms glass. For since this transmutation of [45] ashes into glass seemed to me as wonderful as any other that occurs in nature, I took particular pleasure in describing it.

Still, I did not want to infer from all these things that this world was created in the way I was proposing; for it is far more likely that God made it, from the very beginning, just as it had to be. But it is certain, and it is an opinion commonly accepted among theologians, that the action by which he now preserves it is exactly the same as the action by which he created it. So even if, at the beginning, he had given it no other form than that of chaos, provided that, having established the laws of nature, he lent it his concurrence so that it could act as it usually does, we may believe, without detracting from the miracle of creation, that by this alone all purely material things could, in time, have become just as we see them now. And their nature is much easier to conceive when we see them come into being little by little in this way than when we consider them only as already complete.

THE BODY AS A MACHINE

Descartes imagines a human body made by God from matter alone and works out its functions.

From the description of inanimate bodies and plants, I went on to that of animals, and in particular to that of human beings. But since I did not yet know enough about them to speak of them in the same style as the rest—that is, by demonstrating effects from their causes, and showing from what seeds and in what way nature must produce them—I contented myself with supposing that God formed the body of a man exactly like [46] one of ours, both in the outward shape of its limbs and in the internal structure of its organs, without making it of any matter other than the matter I had described, and without putting into it, at the beginning, any rational soul, or anything else to serve as a vegetative or sensitive soul. He merely kindled in its heart one of those fires without light which I had already explained, and which I conceived to be of no other nature than the fire that heats hay when it has been stored before it was dry, or that makes new wine ferment when it is left to steep on the crushed grapes.[4] For when I examined the functions that could, as a result, be present in this body, I found in it exactly all those that can be in us without our thinking about them, and therefore without any contribution from our soul—that is, from that part distinct from the body whose nature, as was said above, is simply to think. These are all the same functions in which we can say that animals without reason resemble us. Yet I could not find in it any of those functions which, depending on thought, are the only ones that belong to us as human beings; whereas I did find them all afterward, once I had supposed that God created a rational soul and joined it to this body in a certain way that I described.

4 The "vegetative" and "sensitive" souls are the scholastic (Aristotelian) principles of nutrition and growth, and of sensation and movement.

THE MOVEMENT OF THE HEART

Descartes describes the heart's chambers and valves and explains its movement by heat expanding the blood.

But so that you can see how I treated this subject there, I want to set down here my explanation of the movement of the heart and arteries. Since it is the first and most general movement observed in animals, it will make it easy to judge what we should [47] think of all the others. And so that there will be less difficulty in understanding what I am going to say about it, I would like those who are not versed in anatomy to take the trouble, before reading this, to have the heart of some large animal with lungs cut open in front of them—for in all such animals it is quite similar to the human heart—and to have the two chambers or cavities in it pointed out to them. First, the one on its right side, to which two very wide tubes correspond: namely, the vena cava, which is the main receptacle of the blood, and like the trunk of a tree of which all the other veins of the body are the branches; and the arterial vein, which has been badly named, since it is in fact an artery, which originates in the heart and, after leaving it, divides into many branches that spread throughout the lungs.[5] Then the one on its left side, to which there likewise correspond two tubes, as wide as the previous ones or wider: namely, the venous artery, which has also been badly named, because it is nothing but a vein. It comes from the lungs, where it is divided into many branches, interlaced with those of the arterial vein and with those of the passage called the windpipe, through which the air we breathe enters. And the great artery, which leaves the heart and sends its branches throughout the body.[6] I would also like them to be shown carefully the eleven little membranes which, like so many little doors, open and close the four openings in these two cavities. [48]

5 The "arterial vein" is what we now call the pulmonary artery; the "venous artery" in the next paragraph is the pulmonary vein.
6 The "great artery" is the aorta.

Namely: three at the entrance of the vena cava, arranged so that they cannot in any way prevent the blood it contains from flowing into the right cavity of the heart, and yet exactly prevent it from flowing back out; three at the entrance of the arterial vein, which, being arranged the opposite way, readily allow the blood in that cavity to pass into the lungs, but not the blood in the lungs to return to it; likewise two others at the entrance of the venous artery, which let the blood flow from the lungs toward the left cavity of the heart but block its return; and three at the entrance of the great artery, which allow the blood to leave the heart but prevent it from returning. And there is no need to look for any other reason for the number of these membranes than this: the opening of the venous artery, being oval because of where it is located, can conveniently be closed with two, whereas the others, being round, can be better closed with three. Further, I would like them to be made to notice that the great artery and the arterial vein are of a much harder and firmer composition than the venous artery and the vena cava; that these last two widen before entering the heart and form there two pouches, as it were, called the auricles of the heart, which are made of flesh similar to the heart's own; that there is always more heat in the heart than in any other place in the body; and finally, that this heat is capable of making any drop of blood that enters its cavities swell promptly and [49] expand, as all liquids generally do when they are let fall drop by drop into some very hot vessel.

For after this, I need say nothing more to explain the movement of the heart than the following. When its cavities are not full of blood, blood necessarily flows into them—from the vena cava into the right one, and from the venous artery into the left—since these two vessels are always full of it, and their openings, which face the heart, cannot then be blocked. But as soon as two drops of blood have entered in this way, one into each of its cavities, these drops—which cannot help being very large, because the openings through which they enter are very wide and the vessels they come from very full of blood—become rar-

efied and expand because of the heat they find there. By this means, making the whole heart swell, they push and close the five little doors at the entrances of the two vessels they came from, thus preventing any more blood from coming down into the heart; and, continuing to rarefy more and more, they push and open the six other little doors at the entrances of the two other vessels through which they leave, thereby making all the branches of the arterial vein and of the great artery swell almost at the same instant as the heart. Immediately afterward the heart subsides, as do these arteries, because the blood that has entered them cools there; their six little doors close again, and the five of the vena cava and the venous artery reopen and give passage to [50] two more drops of blood, which make the heart and arteries swell again, just as the previous ones did. And because the blood that enters the heart in this way passes through the two pouches called its auricles, their movement is the opposite of the heart's: they subside when it swells. For the rest, so that those who do not know the force of mathematical demonstrations, and are not used to distinguishing true reasons from merely probable ones, do not venture to deny this without examining it, I want to warn them that the movement I have just explained follows just as necessarily from the mere arrangement of the organs, which can be seen with the eye in the heart, from the heat, which can be felt there with the fingers, and from the nature of the blood, which can be known by experience, as the movement of a clock follows from the force, position and shape of its weights and wheels.

But if you ask how the blood in the veins is not used up, flowing continually into the heart in this way, and how the arteries are not overfilled with it, since all the blood that passes through the heart goes on into them, I need give no other answer than what has already been written by an English physician,[7] who deserves praise for having broken the ice on this point, and for being the first to teach that there are many small passages at the ends of the arteries, through which the blood they receive from

7 DESCARTES'S NOTE. Harvey, *On the Motion of the Heart*.

the heart enters the small branches of the veins, from which it goes back again toward the heart; so that its course is nothing but a [51] perpetual circulation.[8] He proves this very well by the ordinary experience of surgeons. When they have tied the arm moderately tight above the place where they open the vein, they make the blood come out more abundantly than if they had not tied it. And quite the opposite would happen if they tied it below, between the hand and the opening, or else tied it very tight above. For it is obvious that a moderately tight tie, while it can prevent the blood already in the arm from returning to the heart through the veins, does not for all that prevent new blood from continually arriving through the arteries. This is because the arteries lie beneath the veins, and their walls, being harder, are less easily compressed; and also because the blood coming from the heart tends with greater force to pass through them toward the hand than it does to return from there to the heart through the veins. And since this blood leaves the arm through the opening in one of the veins, there must necessarily be some passages below the tie—that is, toward the extremities of the arm—through which it can come there from the arteries. He also proves very well what he says about the course of the blood by certain small membranes, arranged at various places along the veins in such a way that they do not allow the blood to pass along them from the middle of the body toward the extremities, but only to return from the extremities toward the heart. And further, by the experience which shows that all the blood in the body can flow out of it in a very short time through a single artery when it is cut, even if it has been tightly tied very close to the heart and cut between the heart and the tie, so that there [52] could be no reason to imagine that the blood flowing out came from anywhere else.

But there are many other things which attest that the true cause of this movement of the blood is the one I have given. First, the difference we notice between the blood that comes out

8 William Harvey (1578–1657), whose *On the Motion of the Heart and Blood in Animals* (1628) established the circulation of the blood.

of the veins and the blood that comes out of the arteries can only arise from this: having been rarefied, and as it were distilled, in passing through the heart, it is finer, livelier and warmer just after leaving it—that is, when it is in the arteries—than it is shortly before entering it—that is, when it is in the veins. And if you pay attention, you will find that this difference is clearly apparent only near the heart, and not so much in the places farthest from it. Then the hardness of the walls of which the arterial vein and the great artery are composed shows well enough that the blood beats against them with more force than against the veins. And why would the left cavity of the heart and the great artery be ampler and wider than the right cavity and the arterial vein, unless it were that the blood of the venous artery, having been only in the lungs since it passed through the heart, is finer and rarefies more strongly and more easily than the blood that comes directly from the vena cava? And what can physicians find out by feeling the pulse, unless they know that, as the blood changes in nature, it can be rarefied by the heat of the heart more or less strongly, and more or less quickly, than before? And if we examine how this heat is communicated to the other limbs, must we not admit that it is [53] by means of the blood, which is reheated as it passes through the heart and spreads from there throughout the body? Hence, if you remove the blood from any part, you remove its heat by the same token; and even if the heart were as hot as a red-hot iron, it would not be enough to warm the feet and hands as it does, if it did not continually send new blood to them. Then too we learn from this that the true purpose of breathing is to bring enough fresh air into the lungs to make the blood that comes there from the right cavity of the heart—where it has been rarefied and, as it were, changed into vapor—thicken and turn into blood again before it falls back into the left cavity. Without this it could not be fit to serve as fuel for the fire that is there. This is confirmed by the fact that animals without lungs also have only one cavity in the heart, and that unborn children, who cannot use their lungs while they are enclosed in their mothers' wombs, have an

opening through which blood flows from the vena cava into the left cavity of the heart, and a duct through which it passes from the arterial vein into the great artery without going through the lungs. Then, how would digestion take place in the stomach if the heart did not send heat there through the arteries, and with it some of the most fluid parts of the blood, which help to dissolve the food put there? And is the action that converts the juice of this food into blood not easy to understand, if we consider that it is distilled by passing and repassing through the heart, perhaps more than one or two hundred times each day? And what more do we need, [54] to explain nutrition and the production of the various humors in the body, than to say this: the force with which the blood, as it rarefies, passes from the heart toward the ends of the arteries makes some of its parts come to rest among those of the limbs where they find themselves, and take the place of some other parts, which they drive out; and, depending on the position, the shape or the smallness of the pores they meet, some go to certain places rather than others—in the same way as anyone may have seen various sieves, pierced in different ways, serve to separate different grains from one another? And finally, the most remarkable thing in all this is the generation of the animal spirits. They are like a very fine wind, or rather like a very pure and lively flame, which, rising continually and in great abundance from the heart into the brain, passes from there through the nerves into the muscles and gives movement to all the limbs. We need not imagine any other cause that makes the parts of the blood which, being the most agitated and penetrating, are the most suitable for composing these spirits, go toward the brain rather than elsewhere,[9] than this: the arteries that carry them there are the ones that come from the heart in the straightest line of all; and, according to the rules of mechanics, which are the same as those of nature, when several things tend together to move toward the same place, where there is not enough room for all of them—as the

9 "Animal spirits" (from Latin *anima*, soul) were the very fine material fluid then thought to carry motion and sensation through the nerves.

parts of the blood leaving the left cavity of the heart tend toward the brain— [55] the weaker and less agitated ones must be turned aside by the stronger, which in this way go there alone.

I had explained all these things in some detail in the treatise I had earlier intended to publish. Next I had shown there what the structure of the nerves and muscles of the human body must be for the animal spirits within them to have the power to move its limbs—as we see that heads, shortly after being cut off, still move and bite the ground, although they are no longer alive. I had shown what changes must take place in the brain to cause waking, sleep and dreams; how light, sounds, smells, tastes, heat and all the other qualities of external objects can imprint various ideas on it through the senses;[10] how hunger, thirst and the other internal passions can also send their ideas there; what must be taken to be the common sense, where these ideas are received; the memory, which preserves them; and the imagination, which can change them in various ways and compose new ones out of them, and by the same means, distributing the animal spirits into the muscles, make the limbs of this body move in as many different ways, and as appropriately to the objects presented to its senses and to the internal passions within it, as our own limbs can move without the will directing them.[11] This will not seem at all strange to those who know how many different *automata*, or moving machines, human ingenuity can [56] make, using only very few parts compared with the great multitude of bones, muscles, nerves, arteries, veins and all the other parts in the body of every animal. They will consider this body as a machine which, having been made by the hands of God, is incomparably better ordered, and has more admirable movements in it, than any machine that can be invented by human beings.

10 The physiology summarized here survives as the *Treatise on Man*, part of *The World*, published only after Descartes's death.

11 The "common sense" is the traditional faculty in the brain where the data of the separate senses are brought together.

MACHINES, ANIMALS AND HUMAN BEINGS

Descartes gives two tests, language and adaptable reason, that distinguish humans from machines and animals.

And here I had dwelt in particular on showing that if there were machines that had the organs and outward shape of a monkey, or of some other animal without reason, we would have no means of recognizing that they were not of exactly the same nature as those animals. Whereas if there were machines that resembled our bodies and imitated our actions as closely as is practically possible, we would always have two very certain means of recognizing that they were not, for all that, real human beings. The first is that they could never use words, or other signs composed of them, as we do to declare our thoughts to others. For we can well conceive of a machine so made that it utters words, and even utters some words appropriate to bodily actions that cause some change in its organs—for instance, if you touch it in one place, it asks what you want of it; if in another, it cries out that you are hurting it; and so on. But we cannot conceive that it would arrange them in various ways so as to [57] respond to the meaning of everything said in its presence, as even the dullest human beings can do. And the second is that, although they might do many things as well as any of us, or perhaps better, they would inevitably fail in certain others, by which we would discover that they were acting not through knowledge but only through the arrangement of their organs. For whereas reason is a universal instrument that can serve in every kind of situation, these organs need some particular arrangement for each particular action. Hence it is practically impossible for a machine to have enough different ones to make it act in all the occurrences of life in the way our reason makes us act.

Now by these same two means we can also know the difference between human beings and beasts. For it is a very remarkable thing that there are no human beings so dull and stupid—

not even excepting people who are mentally ill—that they are not capable of arranging various words together and composing from them a discourse by which they make their thoughts understood; whereas, on the contrary, there is no other animal, however perfect and however well endowed from birth it may be, that does the same. This does not come about because they lack the organs, for we see that magpies and parrots can utter words just as we do, and yet cannot speak as we do—that is, by showing that they think what they are saying. Whereas people born deaf and mute, who are deprived of the organs that serve [58] others for speaking as much as beasts are, or more, usually invent certain signs by themselves, by which they make themselves understood by those who, being regularly with them, have the leisure to learn their language. And this shows not merely that beasts have less reason than human beings, but that they have none at all. For we see that very little is needed to be able to speak. And since we notice inequality among animals of the same species, just as among human beings, and some are easier to train than others, it is not credible that a monkey or a parrot that was among the most perfect of its species would not equal in this the most stupid of children, or at least a child with a disordered brain, unless their soul were of a nature entirely different from ours. And we must not confuse words with natural movements, which express the passions and can be imitated by machines as well as by animals; nor think, like some of the ancients, that beasts speak although we do not understand their language. For if that were true, since they have many organs corresponding to ours, they could make themselves understood by us as well as by their own kind. It is also a very remarkable thing that, although there are many animals that show more skill than we do in some of their actions, we see that the same animals show none at all in many others. So what they do better than we do does not prove that they have a mind—for on that reckoning they would have more of it than any of us, and [59] would do better in everything—but rather that they have none, and that it is nature that acts in them according to the arrange-

ment of their organs. In the same way we see that a clock, made only of wheels and springs, can count the hours and measure time more accurately than we can with all our wisdom.

After that I had described the rational soul, and shown that it can in no way be derived from the power of matter, like the other things I had spoken of, but must be expressly created; and how it is not enough for it to be lodged in the human body like a pilot in his ship—except perhaps to move its limbs—but that it must be joined and united more closely with it in order to have, in addition, feelings and appetites like ours, and so make up a real human being. For the rest, I have dwelt here a little on the subject of the soul, because it is one of the most important. For after the error of those who deny God, which I think I have refuted well enough above, there is none that leads weak minds further from the straight road of virtue than imagining that the soul of beasts is of the same nature as ours, and that consequently we have nothing to fear or to hope for after this life, any more than flies and ants. Whereas, when we know how much they differ, we understand much better the reasons which prove that our soul is of a nature entirely independent of the body, and consequently that it is not bound to die with it. Then, since [60] we see no other causes that destroy it, we are naturally led to judge from this that it is immortal.

Part Six

What is needed to advance the study of nature
Why Descartes published, and why he wrote in French.

Now it is three years since I had reached the end of the treatise that contains all these things, and was beginning to revise it in order to put it into the hands of a printer, when I learned that persons to whom I defer, and whose authority over my actions is hardly less than that of my own reason over my thoughts, had disapproved of an opinion in physics published a little earlier by someone else. I do not want to say that I held this opinion, but only that I had noticed nothing in it,[1] before their censure, that I could imagine to be harmful either to religion or to the state, nor, consequently, anything that would have prevented me from writing it if reason had persuaded me of it. And this made me fear that there might likewise be some opinion among my own in which I had been mistaken, despite the great care I have always taken not to admit any new ones into my beliefs without very certain demonstrations of them, and not to write any that could turn to anyone's disadvantage. This was enough to make me change my resolution to publish them. For although the reasons for which I had previously made it were very strong, my inclination, which has always made me hate the business of writing books, immediately made me find enough others to excuse myself from it. And these reasons, on both sides, are such that not [61] only do I have some interest in stating them

1 The allusion is to the condemnation of Galileo by the Roman Inquisition in 1633 for defending the motion of the earth.

here, but perhaps the public also has some interest in knowing them.

MASTERS AND POSSESSORS OF NATURE

Descartes explains why useful knowledge of nature, above all in medicine, obliged him to share his findings.

I have never set much store by the things that came from my own mind. As long as the only fruits I gathered from the method I use were that I satisfied myself concerning some difficulties belonging to the speculative sciences, or that I tried to govern my conduct by the reasons it taught me, I did not believe I was obliged to write anything about it. For as regards conduct, everyone is so full of his own opinions that there could be as many reformers as heads, if it were permitted to undertake any change in it to anyone other than those whom God has established as sovereigns over his peoples, or those to whom he has given enough grace and zeal to be prophets. And although my speculations pleased me greatly, I believed that others had their own, which perhaps pleased them more. But as soon as I had acquired some general notions in physics, and, beginning to test them on various particular difficulties, had noticed how far they can lead and how much they differ from the principles that have been used up to now, I believed that I could not keep them hidden without sinning gravely against the law that obliges us to bring about, as far as is in our power, the general good of all human beings. For they showed me that it is possible to arrive at knowledge that would be very useful in life; and that, instead of the speculative philosophy taught in the schools, we can find [62] a practical one, by which, knowing the force and actions of fire, water, air, the stars, the heavens and all the other bodies around us as distinctly as we know the various trades of our craftsmen, we could use them in the same way for all the purposes for which they are suited, and thus make ourselves, as it were, masters and possessors of nature. This is desirable not only for the invention of an infinity of devices that would let us enjoy,

without any effort, the fruits of the earth and all the comforts found there, but also, and above all, for the preservation of health, which is undoubtedly the first good and the foundation of all the other goods of this life. For even the mind depends so heavily on the temperament and on the arrangement of the bodily organs that, if it is possible to find some means that would generally make people wiser and more capable than they have been up to now, I believe it is in medicine that we must look for it. It is true that the medicine now practiced contains few things whose usefulness is so remarkable. But, without having any intention of disparaging it, I am sure there is no one, even among those who practice it, who would not admit that everything known in it is almost nothing compared with what remains to be known; and that we could free ourselves from an infinity of diseases, of the mind as well as of the body, and perhaps even from the weakening of old age, if we had enough knowledge of their causes and of all the remedies with which nature has provided us. Now, intending [63] to devote my whole life to the pursuit of so necessary a science, and having found a path which seems to me such that, by following it, one must infallibly find it, unless prevented either by the shortness of life or by the lack of experiments, I judged that there was no better remedy against these two obstacles than to communicate faithfully to the public all the little I had found, and to invite good minds to try to go further, each contributing, according to his inclination and his ability, to the experiments that would have to be made, and also communicating to the public everything they learned. In this way, the later ones beginning where their predecessors had left off, and so joining together the lives and labors of many, we might all together go much further than each one could on his own.

THE NEED FOR EXPERIMENTS

Descartes explains how he derived principles from God and why many experiments are now needed.

I even noticed, regarding experiments, that they become more necessary the further one has advanced in knowledge. For at the beginning it is better to use only those that present themselves to our senses of their own accord, and which we cannot be unaware of if we reflect on them even a little, than to look for rarer and more elaborate ones. The reason is that the rarer ones often mislead us when we do not yet know the causes of the more common ones, and the circumstances on which they depend are almost always so particular and so minute that they are very hard to notice. But the order I have followed in this has been as follows. First, I have tried to find in general the [64] principles, or first causes, of everything that is or can be in the world, without considering for this purpose anything but God alone, who created it, and without drawing them from anywhere but certain seeds of truth that are naturally in our souls. After that, I examined what were the first and most ordinary effects that could be deduced from these causes; and it seems to me that in this way I found heavens, stars, an earth, and even, on the earth, water, air, fire, minerals and some other such things, which are the most common and the simplest of all, and consequently the easiest to know. Then, when I wanted to descend to more particular things, so many different ones presented themselves to me that I did not believe it possible for the human mind to distinguish the forms or species of bodies that are on the earth from an infinity of others that might be there if it had been God's will to put them there, nor, consequently, to bring them to our use, unless we come to the causes through the effects and make use of many particular experiments. Following this, running my mind over all the objects that had ever presented themselves to my senses, I venture to say that I have noticed nothing in them that I could not explain quite readily by the

principles I had found. But I must also admit that the power of nature is so ample and so vast, and these principles are so simple and so general, that I hardly notice any particular effect any longer without recognizing at once that it can [65] be deduced from them in several different ways; and my greatest difficulty is usually to find in which of these ways it depends on them. For this I know no other expedient than to look again for some experiments of such a kind that their outcome would not be the same if the effect has to be explained in one of these ways as if it has to be explained in the other. For the rest, I have now reached the point where I see, it seems to me, well enough how to go about making most of the experiments that can serve this purpose. But I also see that they are of such a kind, and so numerous, that neither my hands nor my income, even if I had a thousand times more than I have, could suffice for all of them. So, according as I have the opportunity from now on to make more or fewer of them, I will also advance more or less in the knowledge of nature. This is what I hoped to make known through the treatise I had written, and to show in it so clearly the benefit the public could receive from it that I would oblige all those who desire the good of humankind in general—that is, all those who are truly virtuous, and not by false pretense or merely in reputation—both to communicate to me the experiments they have already made and to help me in the search for those that remain to be made.

But since then I have had other reasons that made me change my mind and think that I really ought to go on writing down everything I judged to be of some importance, as I discovered its truth, and to take the same care over it as if I meant to have it printed. I would do this, first, [66] so as to have all the more occasion to examine these things well—for no doubt we always look more closely at what we believe will be seen by many than at what we do only for ourselves, and things that seemed true to me when I first began to conceive them have often looked false when I tried to put them on paper; and second, so as not to lose any chance of benefiting the public, if I am capable of it, and so

that, if my writings are worth anything, those who have them after my death may use them in whatever way is most fitting. But I also thought I ought not on any account to consent to their being published during my lifetime, so that neither the objections and controversies they might provoke, nor even whatever reputation they might earn me, would give me any occasion to lose the time I intend to spend on instructing myself. For although it is true that everyone is obliged to promote the good of others as far as he can, and that to be useful to no one is really to be worth nothing, it is also true that our concerns ought to reach beyond the present time. It is good to leave aside things that might bring some profit to those now living when we do so in order to do other things that will bring more to our descendants. And in fact I am glad to have it known that the little I have learned so far is almost nothing compared with what I do not know and do not despair of being able to learn. For it is much the same with those who gradually discover the truth in the [67] sciences as with those who are beginning to grow rich: they have less trouble making large acquisitions than they had before, when they were poorer, in making much smaller ones. Or we may compare them to army commanders, whose forces usually grow in proportion to their victories, and who need more skill to hold their ground after losing a battle than they need, after winning one, to take towns and provinces. For trying to overcome all the difficulties and errors that keep us from reaching knowledge of the truth is truly fighting battles, and accepting some false opinion on a fairly general and important matter is losing one. Afterwards much more skill is needed to get back to where we were before than is needed to make great progress when we already have principles that are secure. As for me, if I have found any truths in the sciences before now (and I hope the contents of this volume will lead people to judge that I have found some), I can say that they are only the consequences and offshoots of five or six principal difficulties that I have overcome, and that I count as so many battles in which fortune was on my side. I will even venture to say that I think I need to win

only two or three more like them to carry out my plans entirely; and that I am not so advanced in years that, in the ordinary course of nature, I may not still have enough time for this.[2] [68] But I believe I am all the more obliged to be sparing with the time I have left, the more hope I have of being able to use it well; and I would no doubt have many occasions to lose it if I published the foundations of my physics. For although they are almost all so evident that one need only understand them to believe them, and there is none for which I do not think I can give demonstrations, still, since they cannot possibly agree with all the various opinions of other people, I foresee that I would often be distracted by the opposition they would arouse.

It may be said that this opposition would be useful: both to make me aware of my mistakes, and so that, if I had anything good, others would understand it better by this means; and also —since many people can see more than one person alone—so that, beginning to make use of it right away, they would help me with their own discoveries too. But although I recognize that I am extremely liable to error, and almost never trust the first thoughts that come to me, my experience of the objections that can be made to me keeps me from hoping for any profit from them. For I have often already put to the test the judgments of those I took to be my friends, of some others to whom I thought I was indifferent, and even of some whose malice and envy, I knew, would try hard enough to uncover what affection would hide from my friends. Yet it has rarely happened that anyone raised an objection I had not foreseen at all, unless it was [69] far removed from my subject. So I have almost never met any critic of my opinions who did not seem to me either less rigorous or less fair than I am myself. Nor have I ever observed that the disputations practiced in the schools have brought to light any truth that was unknown before. For while each side tries to win, they work far harder at making the most of what is plausible than at weighing the arguments on either side; and those who

2 Descartes was forty-one in 1637.

have long been good advocates do not, for all that, become better judges afterwards.[3]

As for the benefit others would get from my communicating my thoughts, it could not be very great either, since I have not yet taken them so far that much would not need to be added before they could be put to use. And I think I can say without vanity that if anyone is capable of doing this, it must be I rather than anyone else—not that there may not be many minds in the world incomparably better than mine, but because one cannot conceive a thing so well, and make it one's own, when one learns it from someone else as when one discovers it oneself. This is so true in this matter that, although I have often explained some of my opinions to very intelligent people, who seemed to understand them quite distinctly while I was speaking to them, I have noticed that when they repeated them they almost always changed them so much that I could no longer acknowledge them as mine. For this reason I am [70] glad to take the opportunity here to ask our descendants never to believe that things they are told come from me, unless I have published them myself. And I am not at all surprised at the extravagant views attributed to all those ancient philosophers whose writings we do not have. Nor do I conclude from this that their thoughts were very unreasonable, since they were among the best minds of their times; only that they have been badly reported to us. So too we see that almost never has any of their followers surpassed them; and I am sure that the most ardent of those who now follow Aristotle would think themselves fortunate if they had as much knowledge of nature as he had, even on condition that they would never have any more. They are like ivy, which never tries to climb higher than the trees that hold it up, and often even comes back down after reaching their tops. For it seems to me that those people too come back down—that is, somehow make themselves less learned than if they gave up studying—who, not content to know everything that is intelli-

3 Formal debates on set questions were a standard exercise in the universities, where scholastic philosophy was taught.

gibly explained in their author, want in addition to find in him the solution to many difficulties about which he says nothing, and which perhaps he never thought of. Still, their way of philosophizing is very convenient for those who have only quite mediocre minds. For the obscurity of the distinctions and principles they use allows them to speak of everything as boldly as if they knew it, and to defend everything they [71] say about it against the most subtle and skillful, without anyone having a way to prove them wrong. In this they seem to me like a blind man who, in order to fight a sighted man without disadvantage, has brought him down into the depths of some very dark cellar. And I can say that such people have an interest in my refraining from publishing the principles of the philosophy I use. For since they are very simple and very evident, as they are, publishing them would be almost like opening some windows and letting daylight into the cellar where they have gone down to fight. But even the best minds have no reason to wish to know them. For if they want to be able to talk about everything and gain a reputation for learning, they will manage it more easily by contenting themselves with plausibility, which can be found without much trouble in every kind of subject, than by seeking the truth, which is discovered only little by little in a few subjects, and which, when it comes to speaking of the others, obliges one to admit frankly that one does not know them. But if they prefer knowing a few truths to the vanity of appearing ignorant of nothing—as no doubt is much preferable—and wish to follow a plan like mine, they do not need me to tell them anything more than I have already said in this discourse. For if they are capable of going further than I have, they will be all the more capable of finding by themselves everything I think I have found. Since I have never examined anything except in order, it is certain that what remains for me to discover is [72] in itself more difficult and more hidden than what I have been able to come upon so far; and they would take much less pleasure in learning it from me than by themselves. Besides, the habit they will acquire by seeking easy things first, and passing little by little, by degrees, to

others more difficult, will serve them better than all my instructions could. For my own part, I am convinced that if I had been taught, from my youth, all the truths whose demonstrations I have since sought, and had had no trouble learning them, I would perhaps never have known any others, and at least I would never have acquired the habit and facility I think I have of always finding new ones as I apply myself to looking for them. In a word, if there is any work in the world that cannot be finished as well by anyone else as by the one who began it, it is the one I am working on.

It is true that, as for the experiments that may serve it, one man alone could not suffice to perform them all. But neither could he usefully employ any hands but his own, except those of craftsmen, or such people as he could pay, whom the hope of gain—a very effective means—would lead to do exactly everything he told them. For as for volunteers, who might offer to help him out of curiosity or a desire to learn: besides the fact that they usually promise more than they deliver, and make only fine proposals of which none ever comes to anything, they [73] would infallibly want to be paid by having some difficulties explained to them, or at least in compliments and useless conversations, which could not cost him so little of his time that he would not lose by it. And as for experiments others have already performed, even if they were willing to share them with him—which those who call them secrets would never do—most of them involve so many circumstances or superfluous ingredients that it would be very hard for him to make out the truth in them. Besides, he would find almost all of them so badly explained, or even so false—because those who performed them strove to make them appear consistent with their principles—that, even if there were some that were of use to him, they could not in turn be worth the time he would need to spend picking them out. So if there were someone in the world who was known for certain to be capable of finding the greatest things, and the most useful to the public, that there could be, and if for that reason other people strove by every means to help him carry out his plans, I

do not see that they could do anything for him except meet the costs of the experiments he needed, and for the rest keep his leisure from being taken from him by anyone's importunity. But besides the fact that I do not presume so much of myself as to want to promise anything extraordinary, nor feed on such vain thoughts as to imagine that the public ought to take a great interest in my plans, neither is my soul so base that I would be willing to accept from anyone at all [74] any favor that people might think I had not deserved.

WHY THIS BOOK APPEARS

Descartes explains why he publishes these essays after all and invites readers to send objections.

All these considerations taken together were the reason why, three years ago, I did not want to make public the treatise I had in hand, and even resolved not to let any other be seen during my lifetime that was so general, or from which the foundations of my physics could be understood. But since then two further reasons have obliged me to include some particular essays here, and to give the public some account of my actions and my plans. The first is that, if I failed to do so, many people who knew of my earlier intention to have some writings printed might imagine that my reasons for refraining were more to my discredit than they are. For although I do not love glory excessively—or even, if I dare say so, I hate it, insofar as I judge it contrary to peace, which I value above all things—still I have never tried to hide my actions as if they were crimes, nor taken many precautions to remain unknown. This is both because I would have thought I was wronging myself, and because it would have given me a kind of anxiety, which again would have been contrary to the perfect peace of mind I am seeking. And since, having always kept myself indifferent in this way between caring to be known and caring not to be, I have not been able to prevent my acquiring some kind of reputation, I thought I ought to do my best at least to spare myself a bad one. The other reason that has

obliged me to write [75] this is that I see more clearly every day the delay that my plan of instructing myself is suffering, because of the countless experiments I need, which I cannot possibly perform without others' help. And although I do not flatter myself so far as to hope that the public will take a great share in my interests, still I do not want to fail myself so badly as to give those who outlive me grounds to reproach me some day that I could have left them many things far better than those I will have left, if I had not been too negligent in letting them know how they could contribute to my plans.

And I thought it would be easy for me to choose some subjects which, without being open to much controversy or obliging me to reveal more of my principles than I wish, would nevertheless show clearly enough what I can and cannot do in the sciences. Whether I have succeeded in this I cannot say, and I do not want to forestall anyone's judgment by speaking of my writings myself. But I will be very glad to have them examined; and so that there may be all the more occasion for this, I ask all those who have any objections to make to take the trouble of sending them to my publisher. Once he lets me know of them, I will try to attach my reply to them at the same time; and in this way readers, seeing both together, will judge the truth all the more easily.[4] For I do not promise ever to give long replies, but only to admit my mistakes very frankly if I recognize them, or else, [76] if I cannot see them, to say simply what I believe is required to defend what I have written, without adding the explanation of any new subject, so as not to get drawn endlessly from one into another.

If some of the things I spoke of at the beginning of the *Optics* and the *Meteorology* are off-putting at first, because I call them suppositions and do not seem inclined to prove them, let the reader have the patience to read the whole with attention, and I hope he will be satisfied. For it seems to me that the arguments there follow one another in such a way that, just as the last are demonstrated by the first, which are their causes, so the first are

4 The volume was printed at Leiden in 1637 by the bookseller-publisher Jan Maire.

in turn demonstrated by the last, which are their effects. And no one should imagine that I am committing here the fault that logicians call a circle. For since experience makes most of these effects very certain, the causes from which I deduce them serve not so much to prove them as to explain them; on the contrary, it is the causes that are proved by the effects. And I have called them suppositions only so that people may know that I think I can deduce them from the primary truths I explained above, but that I have deliberately chosen not to do so. I wanted to prevent certain minds—who imagine that they know in a day everything another person has thought over twenty years, as soon as he has said just two or three words to them about it, and who are all the more liable to err, and the less capable of the truth, the more penetrating and quick they are—from [77] seizing the occasion to build some extravagant philosophy on what they take to be my principles, and from having the blame for it laid on me. As for the opinions that are wholly my own, I make no apology for their being new. For if their reasons are properly considered, I am sure they will be found so simple and so in keeping with common sense that they will seem less extraordinary and less strange than any others one might hold on the same subjects. Nor do I boast of being the first discoverer of any of them; I say only that I have never accepted them either because others had said them or because they had not, but solely because reason persuaded me of them.

If craftsmen cannot immediately carry out the invention explained in the *Optics*, I do not think anyone can say for that reason that it is bad. For since skill and practice are needed to make and adjust the machines I have described without missing any detail, I would be no less surprised if they succeeded on the first try than if someone could learn to play the lute excellently in a day, simply because he had been given good tablature.[5]

5 The invention is a machine for grinding lenses to a hyperbolic shape, described at the end of the *Optics*. Tablature is the written notation used for lute music.

WRITING IN FRENCH

Descartes explains why he writes in French and resolves to devote his remaining time to medicine.

And if I write in French, the language of my country, rather than in Latin, the language of my teachers, it is because I hope that those who use only their pure natural reason will judge my opinions better than those who believe only in ancient books. And as for those who combine good sense with study, whom alone I wish to have as [78] my judges, they will not, I am sure, be so partial to Latin as to refuse to hear my reasons because I explain them in the common tongue.

For the rest, I do not want to speak here in detail of the progress I hope to make in the sciences in future, or to bind myself to the public by any promise I am not sure of fulfilling. I will say only that I have resolved to spend the time I have left to live on nothing but trying to acquire some knowledge of nature from which we can derive rules for medicine more reliable than those we have had until now; and that my inclination turns me so strongly away from every other kind of plan, especially those that could be useful to some only by harming others, that if circumstances forced me to take them up, I do not believe I would be capable of succeeding at them. I make this declaration here knowing well that it cannot serve to make me a person of consequence in the world; but then I have no wish at all to be one. And I will always hold myself more obliged to those by whose favor I may enjoy my leisure without hindrance than I would be to those who offered me the most honorable positions on earth.