Discourse and Essays

Translator's preface

Descartes' first published writings, the *Discourse and Essays* appeared anonymously at Leiden in June 1637, under the full title *Discourse on the Method of rightly conducting one's reason and seeking the truth in the sciences, and in addition the Optics, the Meteorology and the Geometry, which are essays in this Method (Discours de la Méthode pour bien conduire sa raison, et chercher la vérité dans les sciences. Plus la Dioptrique, les Météores et la Géométrie qui sont des essais de cette Méthode).*

This title is an abbreviated form of the more elaborate title that Descartes proposed in a letter to Mersenne of March 1636, where he speaks of 'four treatises, all in French, with the general title: *The Plan of a universal Science which is capable of raising our nature to its highest degree of perfection. In addition, the Optics, the Meteorology and the Geometry, in which the Author, in order to give proof of his universal Science, explains the most abstruse Topics he could choose, and does so in such a way that even persons who have never studied can understand them.*' When Mersenne raised questions about the title of the published work, Descartes replied (in a letter of February 1637):

> I have not put *Treatise on the Method* but *Discourse on the Method*, which amounts to the same as *Preface* or *Note concerning the Method*, in order to show that I do not intend to teach the method but only to speak about it. For, as can be seen from what I say, it consists much more in practice than in theory. I call the treatises following it *Essays in this Method* because I claim that what they contain could not have been discovered without it, and they enable us to recognize its value. And I have included a certain amount of metaphysics, physics and medicine in the introductory *Discourse* in order to show that the method extends to every kind of subject-matter.

The *Essays* were all written or conceived well before the *Discourse*. Thus, Descartes announces his intention to write the *Meteorology* in a letter to Mersenne of 8 October 1629, and in the same letter he also indicates his wish to publish anonymously, with the author 'hidden behind the picture so as to hear what is said of it'. The *Optics* is mentioned in a letter of 1630, and Descartes sent a part of it (probably

the section on refraction) to a correspondent in 1632. He refers to it in *The World*, which was completed in 1633, and in 1635 he showed it to Huygens, to whom he wrote in November of his plan to publish the *Meteorology* with the *Optics*, and to add to them a 'preface'. As for the *Geometry*, Descartes claimed (in a letter of 22 February 1638) that it was written out, and even in part devised, while the *Meteorology* was being printed (i.e. in the spring of 1636). But he also maintains that he had known one of its results 'for twenty years' (letter to Mersenne, 29 June 1638), and his correspondence confirms that the *Geometry* contains discoveries made prior to 1630.

In 1644 a Latin translation of the *Discourse and Essays* (omitting the *Geometry*) was published at Amsterdam. This translation incorporates changes made by Descartes himself, but none of them indicates any important modification of his philosophical views. Hence the present translation, which comprises the whole of the *Discourse* and substantial excerpts from the *Optics*, follows only Adam and Tannery's edition of the French original.[1]

R.S.

1 See General Introduction, p. x above.

DISCOURSE ON THE METHOD

AT VI

of rightly conducting one's reason and seeking the truth in the sciences

1

If this discourse seems too long to be read at a sitting you may divide it into six parts. In the first you will find various considerations regarding the sciences; in the second, the principal rules of the method which the author has sought; in the third, some of the moral rules he has derived from this method; in the fourth, the arguments by which he proves the existence of God and the human soul, which are the foundations of his metaphysics; in the fifth, the order of the questions in physics that he has investigated, particularly the explanation of the movement of the heart and of some other difficulties pertaining to medicine, and also the difference between our soul and that of the beasts; and in the last, the things he believes necessary in order to make further progress in the investigation of nature than he has made, and the reasons which made him write this discourse.

Part One

Good sense is the best distributed thing in the world: for everyone thinks himself so well endowed with it that even those who are the hardest to 2
please in everything else do not usually desire more of it than they possess. In this it is unlikely that everyone is mistaken. It indicates rather that the power of judging well and of distinguishing the true from the false – which is what we properly call 'good sense' or 'reason' – is naturally equal in all men, and consequently that the diversity of our opinions does not arise because some of us are more reasonable than others but solely because we direct our thoughts along different paths and do not attend to 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 the greatest virtues; and those who proceed but very slowly can make much greater progress, if they always follow the right path, than those who hurry and stray from it.

For my part, I have never presumed my mind to be in any way more perfect than that of the ordinary man; indeed, I have often wished to have as quick a wit, or as sharp and distinct an imagination, or as ample

or prompt a memory as some others. And apart from these, I know of no other qualities which serve to perfect the mind; for, as regards reason or sense, since it is the only thing that makes us men and distinguishes us from the beasts, I am inclined to believe that it exists whole and complete in each of us. Here I follow the common opinion of the philosophers,
3 who say there are differences of degree only between the *accidents*, and not between the *forms* (or natures) of *individuals* of the same *species*.

But I say without hesitation that I consider myself very fortunate to have happened upon certain paths in my youth which led me to considerations and maxims from which I formed a method whereby, it seems to me, I can increase my knowledge gradually and raise it little by little to the highest point allowed by the mediocrity of my mind and the short duration of my life. Now I always try to lean towards diffidence rather than presumption in the judgements I make about myself; and when I cast a philosophical eye upon the various activities and undertakings of mankind, there are almost none which I do not consider vain and useless. Nevertheless I have already reaped such fruits from this method that I cannot but feel extremely satisfied with the progress I think I have already made in the search for truth, and I cannot but entertain such hopes for the future as to venture the opinion that if any purely human occupation has solid worth and importance, it is the one I have chosen.

Yet I may be wrong: perhaps what I take for gold and diamonds is nothing but a bit of copper and glass. I know how much we are liable to err in matters that concern us, and also how much the judgements of our friends should be distrusted when they are in our favour. I shall be glad,
4 nevertheless, to reveal in this discourse what paths I have followed, and to represent my life in it as if in a picture, so that everyone may judge it for himself; and thus, learning from public response the opinions held of it, I shall add a new means of self-instruction to those I am accustomed to using.

My present aim, then, is not to teach the method which everyone must follow in order to direct his reason correctly, but only to reveal how I have tried to direct my own. One who presumes to give precepts must think himself more skilful than those to whom he gives them; and if he makes the slightest mistake, he may be blamed. But I am presenting this work only as a history or, if you prefer, a fable in which, among certain examples worthy of imitation, you will perhaps also find many others that it would be right not to follow; and so I hope it will be useful for some without being harmful to any, and that everyone will be grateful to me for my frankness.

From my childhood I have been nourished upon letters, and because I

was persuaded that by their means one could acquire a clear and certain knowledge of all that is useful in life, I was extremely eager to learn them. But as soon as I had completed the course of study at the end of which one is normally admitted to the ranks of the learned, I completely changed my opinion. For I found myself beset by so many doubts and errors that I came to think I had gained nothing from my attempts to become educated but increasing recognition of my ignorance. And yet I 5
was at one of the most famous schools in Europe, where I thought there must be learned men if they existed anywhere on earth. There I had learned everything that the others were learning; moreover, not content with the subjects they taught us, I had gone through all the books that fell into my hands concerning the subjects that are considered most abstruse and unusual. At the same time, I knew how the others judged me, and I saw that they did not regard me as inferior to my fellow students, even though several among them were already destined to take the place of our teachers. And finally, the age in which we live seemed to me to be as flourishing, and as rich in good minds, as any before it. This made me feel free to judge all others by reference to myself and think there was no knowledge in the world such as I had previously been led to hope for.

I did not, however, cease to value the exercises done in the Schools. I knew that the languages learned there are necessary for understanding the works of the ancients; that the charm of fables awakens the mind, while the memorable deeds told in histories uplift it and help to shape one's judgement if they are read with discretion; that reading good books is like having a conversation with the most distinguished men of past ages – indeed, a rehearsed conversation in which these authors reveal to us only the best of their thoughts; that oratory has incomparable powers and beauties; that poetry has quite ravishing delicacy and sweetness; that 6
mathematics contains some very subtle devices which serve as much to satisfy the curious as to further all the arts and lessen man's labours; that writings on morals contain many very useful teachings and exhortations to virtue; that theology instructs us how to reach heaven; that philosophy gives us the means of speaking plausibly about any subject and of winning the admiration of the less learned; that jurisprudence, medicine, and other sciences bring honours and riches to those who cultivate them; and, finally, that it is good to have examined all these subjects, even those full of superstition and falsehood, in order to know their true value and guard against being deceived by them.

But I thought I had already given enough time to languages and likewise to reading the works of the ancients, both their histories and their fables. For conversing with those of past centuries is much the same as travelling. It is good to know something of the customs of various

peoples, so that we may judge our own more soundly and not think that everything contrary to our own ways is ridiculous and irrational, as those who have seen nothing of the world ordinarily do. But one who spends too much time travelling eventually becomes a stranger in his own country; and one who is too curious about the practices of past ages usually remains quite ignorant about those of the present. Moreover,
7 fables make us imagine many events as possible when they are not. And even the most accurate histories, while not altering or exaggerating the importance of matters to make them more worthy of being read, at any rate almost always omit the baser and less notable events; as a result, the other events appear in a false light, and those who regulate their conduct by examples drawn from these works are liable to fall into the excesses of the knights-errant in our tales of chivalry, and conceive plans beyond their powers.

I valued oratory and was fond of poetry; but I thought both were gifts of the mind rather than fruits of study. Those with the strongest reasoning and the most skill at ordering their thoughts so as to make them clear and intelligible are always the most persuasive, even if they speak only low Breton and have never learned rhetoric. And those with the most pleasing conceits and the ability to express them with the most embellishment and sweetness would still be the best poets, even if they knew nothing of the theory of poetry.

Above all I delighted in mathematics, because of the certainty and self-evidence of its reasonings. But I did not yet notice its real use; and since I thought it was of service only in the mechanical arts, I was surprised that nothing more exalted had been built upon such firm and solid foundations. On the other hand, I compared the moral writings of
8 the ancient pagans to very proud and magnificent palaces built only on sand and mud. They extol the virtues, and make them appear more estimable than anything else in the world; but they do not adequately explain how to recognize a virtue, and often what they call by this fine name is nothing but a case of callousness, or vanity, or desperation, or parricide.

I revered our theology, and aspired as much as anyone else to reach heaven. But having learned as an established fact that the way to heaven is open no less to the most ignorant than to the most learned, and that the revealed truths which guide us there are beyond our understanding, I would not have dared submit them to my weak reasonings; and I thought that to undertake an examination of them and succeed, I would need to have some extraordinary aid from heaven and to be more than a mere man.

Regarding philosophy, I shall say only this: seeing that it has been

cultivated for many centuries by the most excellent minds and yet there is still no point in it which is not disputed and hence doubtful, I was not so presumptuous as to hope to achieve any more in it than others had done. And, considering how many diverse opinions learned men may maintain on a single question – even though it is impossible for more than one to be true – I held as well-nigh false everything that was merely probable.

As for the other sciences, in so far as they borrow their principles from philosophy I decided that nothing solid could have been built upon such 9
shaky foundations. Neither the honour nor the riches they offered was enough to induce me to learn them. For my circumstances did not, thanks to God, oblige me to augment my fortune by making science my profession; and although I did not profess to scorn glory, like a Cynic, yet I thought very little of the glory which I could hope to acquire only through false pretences. Finally, as for the false sciences, I thought that I already knew their worth well enough not to be liable to be deceived by the promises of an alchemist or the predictions of an astrologer, the tricks of a magician or the frauds and boasts of those who profess to know more than they do.

That is why, as soon as I was old enough to emerge from the control of my teachers, I entirely abandoned the study of letters. Resolving to seek no knowledge other than that which could be found in myself or else in the great book of the world, I spent the rest of my youth travelling, visiting courts and armies, mixing with people of diverse temperaments and ranks, gathering various experiences, testing myself in the situations which fortune offered me, and at all times reflecting upon whatever came my way so as to derive some profit from it. For it seemed to me that much more truth could be found in the reasonings which a man makes concerning matters that concern him than in those which some scholar makes in his study about speculative matters. For the consequences of the 10
former will soon punish the man if he judges wrongly, whereas the latter have no practical consequences and no importance for the scholar except that perhaps the further they are from common sense the more pride he will take in them, since he will have had to use so much more skill and ingenuity in trying to render them plausible. And it was always my most earnest desire to learn to distinguish the true from the false in order to see clearly into my own actions and proceed with confidence in this life.

It is true that, so long as I merely considered the customs of other men, I found hardly any reason for confidence, for I observed in them almost as much diversity as I had found previously among the opinions of philosophers. In fact the greatest benefit I derived from these observations was that they showed me many things which, although seeming very extravagant and ridiculous to us, are nevertheless commonly

accepted and approved in other great nations; and so I learned not to believe too firmly anything of which I had been persuaded only by example and custom. Thus I gradually freed myself from many errors which may obscure our natural light and make us less capable of heeding reason. But after I had spent some years pursuing these studies in the book of the world and trying to gain some experience, I resolved one day to undertake studies within myself too and to use all the powers of my mind in choosing the paths I should follow. In this I have had much more
11 success, I think, than I would have had if I had never left my country or my books.

Part Two

At that time I was in Germany, where I had been called by the wars that are not yet ended there. While I was returning to the army from the coronation of the Emperor, the onset of winter detained me in quarters where, finding no conversation to divert me and fortunately having no cares or passions to trouble me, I stayed all day shut up alone in a stove-heated room, where I was completely free to converse with myself about my own thoughts.[1] Among the first that occurred to me was the thought that there is not usually so much perfection in works composed of several parts and produced by various different craftsmen as in the works of one man. Thus we see that buildings undertaken and completed by a single architect are usually more attractive and better planned than those which several have tried to patch up by adapting old walls built for different purposes. Again, ancient cities which have gradually grown from mere villages into large towns are usually ill-proportioned, compared with those orderly towns which planners lay out as they fancy on level ground. Looking at the buildings of the former individually, you will often find as much art in them, if not more, than in those of the latter; but in view of their arrangement – a tall one here, a small one there
12 – and the way they make the streets crooked and irregular, you would say it is chance, rather than the will of men using reason, that placed them so. And when you consider that there have always been certain officials whose job is to see that private buildings embellish public places, you will understand how difficult it is to make something perfect by working only on what others have produced. Again, I thought, peoples who have grown gradually from a half-savage to a civilized state, and have made their laws only in so far as they were forced to by the

1 In 1619 Descartes attended the coronation of Ferdinand II in Frankfurt, which took place from 20 July to 9 September. The mentioned army was that of the Catholic Duke Maximilian of Bavaria. It is thought that Descartes was detained in a village near Ulm. His day of solitary reflection in a stove-heated room was, according to Baillet, 10 November 1619. See above, p. 4.

inconvenience of crimes and quarrels, could not be so well governed as those who from the beginning of their society have observed the basic laws laid down by some wise law-giver. Similarly, it is quite certain that the constitution of the true religion, whose articles have been made by God alone, must be incomparably better ordered than all the others. And to speak of human affairs, I believe that if Sparta was at one time very flourishing, this was not because each of its laws in particular was good (seeing that some were very strange and even contrary to good morals), but because they were devised by a single man and hence all tended to the same end.[1] And so I thought that since the sciences contained in books – at least those based upon merely probable, not demonstrative, reasoning – is compounded and amassed little by little from the opinions of many different persons, it never comes so close to the truth as the simple reasoning which a man of good sense naturally makes concerning 13
whatever he comes across. So, too, I reflected that we were all children before being men and had to be governed for some time by our appetites and our teachers, which were often opposed to each other and neither of which, perhaps, always gave us the best advice; hence I thought it virtually impossible that our judgements should be as unclouded and firm as they would have been if we had had the full use of our reason from the moment of our birth, and if we had always been guided by it alone.

Admittedly, we never see people pulling down all the houses of a city for the sole purpose of rebuilding them in a different style to make the streets more attractive; but we do see many individuals having their houses pulled down in order to rebuild them, some even being forced to do so when the houses are in danger of falling down and their foundations are insecure. This example convinced me that it would be unreasonable for an individual to plan to reform a state by changing it from the foundations up and overturning it in order to set it up again; or again for him to plan to reform the body of the sciences or the established order of teaching them in the schools. But regarding the opinions to which I had hitherto given credence, I thought that I could not do better than undertake to get rid of them, all at one go, in order to replace them afterwards with better ones, or with the same ones once I had squared 14
them with the standards of reason. I firmly believed that in this way I would succeed in conducting my life much better than if I built only upon old foundations and relied only upon principles that I had accepted in my youth without ever examining whether they were true. For although I noted various difficulties in this undertaking, they were not insurmountable. Nor could they be compared with those encountered in the reform

1 By tradition the constitution of Sparta was attributed to Lycurgus.

of even minor matters affecting public institutions. These large bodies are too difficult to raise up once overthrown, or even to hold up once they begin to totter, and their fall cannot but be a hard one. Moreover, any imperfections they may possess – and their very diversity suffices to ensure that many do possess them – have doubtless been much smoothed over by custom; and custom has even prevented or imperceptibly corrected many imperfections that prudence could not so well provide against. Finally, it is almost always easier to put up with their imperfections than to change them, just as it is much better to follow the main roads that wind through mountains, which have gradually become smooth and convenient through frequent use, than to try to take a more direct route by clambering over rocks and descending to the foot of precipices.

That is why I cannot by any means approve of those meddlesome and restless characters who, called neither by birth nor by fortune to the management of public affairs, are yet forever thinking up some new
15 reform. And if I thought this book contained the slightest ground for suspecting me of such folly, I would be very reluctant to permit its publication. My plan has never gone beyond trying to reform my own thoughts and construct them upon a foundation which is all my own. If I am sufficiently pleased with my work to present you with this sample of it, this does not mean that I would advise anyone to imitate it. Those on whom God has bestowed more of his favours will perhaps have higher aims; but I fear that even my aim may be too bold for many people. The simple resolution to abandon all the opinions one has hitherto accepted is not an example that everyone ought to follow. The world is largely composed of two types of minds for whom it is quite unsuitable. First, there are those who, believing themselves cleverer than they are, cannot avoid precipitate judgements and never have the patience to direct all their thoughts in an orderly manner; consequently, if they once took the liberty of doubting the principles they accepted and of straying from the common path, they could never stick to the track that must be taken as a short-cut, and they would remain lost all their lives. Secondly, there are those who have enough reason or modesty to recognize that they are less capable of distinguishing the true from the false than certain others by whom they can be taught; such people should be content to follow the opinions of these others rather than seek better opinions themselves.

16 For myself, I would undoubtedly have been counted among the latter if I had had only one teacher or if I had never known the differences that have always existed among the opinions of the most learned. But in my college days I discovered that nothing can be imagined which is too strange or incredible to have been said by some philosopher; and since

then I have recognized through my travels that those with views quite contrary to ours are not on that account barbarians or savages, but that many of them make use of reason as much or more than we do. I thought, too, how the same man, with the same mind, if brought up from infancy among the French or Germans, develops otherwise than he would if he had always lived among the Chinese or cannibals; and how, even in our fashions of dress, the very thing that pleased us ten years ago, and will perhaps please us again ten years hence, now strikes us as extravagant and ridiculous. Thus it is custom and example that persuade us, rather than any certain knowledge. And yet a majority vote is worthless as a proof of truths that are at all difficult to discover; for a single man is much more likely to hit upon them than a group of people. I was, then, unable to choose anyone whose opinions struck me as preferable to those of all others, and I found myself as it were forced to become my own guide.

But, like a man who walks alone in the dark, I resolved to proceed so slowly, and to use such circumspection in all things, that even if I made 17
but little progress I should at least be sure not to fall. Nor would I begin rejecting completely any of the opinions which may have slipped into my mind without having been introduced there by reason, until I had first spent enough time in planning the work I was undertaking and in seeking the true method of attaining the knowledge of everything within my mental capabilities.

When I was younger, my philosophical studies had included some logic, and my mathematical studies some geometrical analysis and algebra. These three arts or sciences, it seemed, ought to contribute something to my plan. But on further examination I observed with regard to logic that syllogisms and most of its other techniques are of less use for learning things than for explaining to others the things one already knows or even, as in the art of Lully, for speaking without judgement about matters of which one is ignorant.[1] And although logic does contain many excellent and true precepts, these are mixed up with so many others which are harmful or superfluous that it is almost as difficult to distinguish them as it is to carve a Diana or a Minerva from an unhewn block of marble. As to the analysis of the ancients and the algebra of the moderns, they cover only highly abstract matters, which seem to have no use. Moreover the former is so closely tied to the examination of figures that it cannot exercise the intellect without greatly tiring the imagination; 18
and the latter is so confined to certain rules and symbols that the end result is a confused and obscure art which encumbers the mind, rather

1 Raymond Lully (1232–1315) was a Catalan theologian whose *Ars Magna* purported to provide a universal method of discovery.

than a science which cultivates it. For this reason I thought I had to seek some other method comprising the advantages of these three subjects but free from their defects. Now a multiplicity of laws often provides an excuse for vices, so that a state is much better governed when it has but few laws which are strictly observed; in the same way, I thought, in place of the large number of rules that make up logic, I would find the following four to be sufficient, provided that I made a strong and unswerving resolution never to fail to observe them.

The first was never to accept anything as true if I did not have evident knowledge of its truth: that is, carefully to avoid precipitate conclusions and preconceptions, and to include nothing more in my judgements than what presented itself to my mind so clearly and so distinctly that I had no occasion to doubt it.

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

The third, to direct my thoughts in an orderly manner, by beginning with the simplest and most easily known objects in order to ascend little by little, step by step, to knowledge of the most complex, and by supposing
19 some order even among objects that have no natural order of precedence.

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

Those long chains composed of very simple and easy reasonings, which geometers customarily use to arrive at their most difficult demonstrations, had given me occasion to suppose that all the things which can fall under human knowledge are interconnected in the same way. And I thought that, provided we refrain from accepting anything as true which is not, and always keep to the order required for deducing one thing from another, there can be nothing too remote to be reached in the end or too well hidden to be discovered. I had no great difficulty in deciding which things to begin with, for I knew already that it must be with the simplest and most easily known. Reflecting, too, that of all those who have hitherto sought after truth in the sciences, mathematicians alone have been able to find any demonstrations – that is to say, certain and evident reasonings – I had no doubt that I should begin with the very things that they studied. From this, however, the only advantage I hoped to gain was to accustom my mind to nourish itself on truths and not to be satisfied with bad reasoning. Nor did I have any intention of trying to learn all the special sciences commonly called 'mathematics'.[1] For I saw that, despite the
20 diversity of their objects, they agree in considering nothing but the various relations or proportions that hold between these objects. And so I

1 These are subjects with a theoretical basis in mathematics, such as astronomy, music and optics.

thought it best to examine only such proportions in general, supposing them to hold only between such items as would help me to know them more easily. At the same time I would not restrict them to these items, so that I could apply them the better afterwards to whatever others they might fit. Next I observed that in order to know these proportions I would need sometimes to consider them separately, and sometimes merely to keep them in mind or understand many together. And I thought that in order the better to consider them separately I should suppose them to hold between lines, because I did not find anything simpler, nor anything that I could represent more distinctly to my imagination and senses. But in order to keep them in mind or understand several together, I thought it necessary to designate them by the briefest possible symbols. In this way I would take over all that is best in geometrical analysis and in algebra, using the one to correct all the defects of the other.

In fact, I venture to say that by strictly observing the few rules I had chosen, I became very adept at unravelling all the questions which fall under these two sciences. So much so, in fact, that in the two or three months I spent in examining them – beginning with the simplest and most general and using each truth I found as a rule for finding further 21
truths – not only did I solve many problems which I had previously thought very difficult, but also it seemed to me towards the end that even in those cases where I was still in the dark I could determine by what means and to what extent it was possible to find a solution. This claim will not appear too arrogant if you consider that since there is only one truth concerning any matter, whoever discovers this truth knows as much about it as can be known. For example, if a child who has been taught arithmetic does a sum following the rules, he can be sure of having found everything the human mind can discover regarding the sum he was considering. In short, the method which instructs us to follow the correct order, and to enumerate exactly all the relevant factors, contains everything that gives certainty to the rules of arithmetic.

But what pleased me most about this method was that by following it I was sure in every case to use my reason, if not perfectly, at least as well as was in my power. Moreover, as I practised the method I felt my mind gradually become accustomed to conceiving its objects more clearly and distinctly; and since I did not restrict the method to any particular subject-matter, I hoped to apply it as usefully to the problems of the other sciences as I had to those of algebra. Not that I would have dared to try at the outset to examine every problem that might arise, for that would itself have been contrary to the order which the method prescribes. But observing that the principles of these sciences must all be derived from

22 philosophy, in which I had not yet discovered any certain ones, I thought that first of all I had to try to establish some certain principles in philosophy. And since this is the most important task of all, and the one in which precipitate conclusions and preconceptions are most to be feared, I thought that I ought not try accomplish it until I had reached a more mature age than twenty-three, as I then was, and until I had first spent a long time in preparing myself for it. I had to uproot from my mind all the wrong opinions I had previously accepted, amass a variety of experiences to serve as the subject-matter of my reasonings, and practise constantly my self-prescribed method in order to strengthen myself more and more in its use.

Part Three

Now, before starting to rebuild your house, it is not enough simply to pull it down, to make provision for materials and architects (or else train yourself in architecture), and to have carefully drawn up the plans; you must also provide yourself with some other place where you can live comfortably while building is in progress. Likewise, lest I should remain indecisive in my actions while reason obliged me to be so in my judgements, and in order to live as happily as I could during this time, I formed for myself a provisional moral code consisting of just three or four maxims, which I should like to tell you about.

23 The first was to obey the laws and customs of my country, holding constantly to the religion in which by God's grace I had been instructed from my childhood, and governing myself in all other matters according to the most moderate and least extreme opinions – the opinions commonly accepted in practice by the most sensible of those with whom I should have to live. For I had begun at this time to count my own opinions as worthless, because I wished to submit them all to examination, and so I was sure I could do no better than follow those of the most sensible men. And although there may be men as sensible among the Persians or Chinese as among ourselves, I thought it would be most useful for me to be guided by those with whom I should have to live. I thought too that in order to discover what opinions they really held I had to attend to what they did rather than what they said. For with our declining standards of behaviour, few people are willing to say everything that they believe; and besides, many people do not know what they believe, since believing something and knowing that one believes it are different acts of thinking, and the one often occurs without the other. Where many opinions were equally well accepted, I chose only the most moderate, both because these are always the easiest to act upon and

probably the best (excess being usually bad), and also so that if I made a mistake, I should depart less from the right path than I would if I chose one extreme when I ought to have pursued the other. In particular, I 24
counted as excessive all promises by which we give up some of our freedom. It was not that I disapproved of laws which remedy the inconstancy of weak minds by allowing us to make vows or contracts that oblige perseverance in some worthy project (or even, for the security of commerce, in some indifferent one). But I saw nothing in the world which remained always in the same state, and for my part I was determined to make my judgements more and more perfect, rather than worse. For these reasons I thought I would be sinning against good sense if I were to take my previous approval of something as obliging me to regard it as good later on, when it had perhaps ceased to be good or I no longer regarded it as such.

My second maxim was to be as firm and decisive in my actions as I could, and to follow even the most doubtful opinions, once I had adopted them, with no less constancy than if they had been quite certain. In this respect I would be imitating a traveller who, upon finding himself lost in a forest, should not wander about turning this way and that, and still less stay in one place, but should keep walking as straight as he can in one direction, never changing it for slight reasons even if mere chance made him choose it in the first place; for in this way, even if he does not go exactly where he wishes, he will at least end up in a place where he is 25
likely to be better off than in the middle of a forest. Similarly, since in everyday life we must often act without delay, it is a most certain truth that when it is not in our power to discern the truest opinions, we must follow the most probable. Even when no opinions appear more probable than any others, we must still adopt some; and having done so we must then regard them not as doubtful, from a practical point of view, but as most true and certain, on the grounds that the reason which made us adopt them is itself true and certain. By following this maxim I could free myself from all the regrets and remorse which usually trouble the consciences of those weak and faltering spirits who allow themselves to set out on some supposedly good course of action which later, in their inconstancy, they judge to be bad.

My third maxim was to try always to master myself rather than fortune, and change my desires rather than the order of the world. In general I would become accustomed to believing that nothing lies entirely within our power except our thoughts, so that after doing our best in dealing with matters external to us, whatever we fail to achieve is absolutely impossible so far as we are concerned. This alone, I thought, would be sufficient to prevent me from desiring in future something I

could not get, and so to make me content. For our will naturally tends to
26 desire only what our intellect represents to it as somehow possible; and so it is certain that if we consider all external goods as equally beyond our power, we shall not regret the absence of goods which seem to be our birthright when we are deprived of them through no fault of our own, any more than we regret not possessing the kingdom of China or of Mexico. Making a virtue of necessity, as they say, we shall not desire to be healthy when ill or free when imprisoned, any more than we now desire to have bodies of a material as indestructible as diamond or wings to fly like the birds. But I admit that it takes long practice and repeated meditation to become accustomed to seeing everything in this light. In this, I believe, lay the secret of those philosophers who in earlier times were able to escape from the dominion of fortune and, despite suffering and poverty, rival their gods in happiness. Through constant reflection upon the limits prescribed for them by nature, they became perfectly convinced that nothing was in their power but their thoughts, and this alone was sufficient to prevent them from being attracted to other things. Their mastery over their thoughts was so absolute that they had reason to count themselves richer, more powerful, freer and happier than other men who, because they lack this philosophy, never achieve such mastery
27 over all their desires, however favoured by nature and fortune they may be.

Finally, to conclude this moral code, I decided to review the various occupations which men have in this life, in order to try to choose the best. Without wishing to say anything about the occupations of others, I thought I could do no better than to continue with the very one I was engaged in, and devote my whole life to cultivating my reason and advancing as far as I could in the knowledge of the truth, following the method I had prescribed for myself. Since beginning to use this method I had felt such extreme contentment that I did not think one could enjoy any sweeter or purer one in this life. Every day I discovered by its means truths which, it seemed to me, were quite important and were generally unknown by other men; and the satisfaction they gave me so filled my mind that nothing else mattered to me. Besides, the sole basis of the foregoing three maxims was the plan I had to continue my self-instruction. For since God has given each of us a light to distinguish truth from falsehood, I should not have thought myself obliged to rest content with the opinions of others for a single moment if I had not intended in due course to examine them using my own judgement; and I could not have avoided having scruples about following these opinions, if I had not
28 hoped to lose no opportunity to discover better ones, in case there were any. Lastly, I could not have limited my desires, or been happy, had I not

been following a path by which I thought I was sure to acquire all the knowledge of which I was capable, and in this way all the true goods within my reach. For since our will tends to pursue or avoid only what our intellect represents as good or bad, we need only to judge well in order to act well, and to judge as well as we can in order to do our best – that is to say, in order to acquire all the virtues and in general all the other goods we can acquire. And when we are certain of this, we cannot fail to be happy.

Once I had established these maxims and set them on one side together with the truths of faith, which have always been foremost among my beliefs, I judged that I could freely undertake to rid myself of all the rest of my opinions. As I expected to be able to achieve this more readily by talking with other men than by staying shut up in the stove-heated room where I had had all these thoughts, I set out on my travels again before the end of winter. Throughout the following nine years I did nothing but roam about in the world, trying to be a spectator rather than an actor in all the comedies that are played out there. Reflecting especially upon the points in every subject which might make it suspect and give occasion for us to make mistakes, I kept uprooting from my mind any errors that might previously have slipped into it. In doing this I was not copying the 29
sceptics, who doubt only for the sake of doubting and pretend to be always undecided; on the contrary, my whole aim was to reach certainty – to cast aside the loose earth and sand so as to come upon rock or clay. In this I think I was quite successful. For I tried to expose the falsity or uncertainty of the propositions I was examining by clear and certain arguments, not by weak conjectures; and I never encountered any proposition so doubtful that I could not draw from it some quite certain conclusion, if only the conclusion that it contained nothing certain. And, just as in pulling down an old house we usually keep the remnants for use in building a new one, so in destroying all those opinions of mine that I judged ill-founded I made various observations and acquired many experiences which I have since used in establishing more certain opinions. Moreover, I continued practising the method I had prescribed for myself. Besides taking care in general to conduct all my thoughts according to its rules, I set aside some hours now and again to apply it more particularly to mathematical problems. I also applied it to certain other problems which I could put into something like mathematical form by detaching them from all the principles of the other sciences, which I did not find sufficiently secure (as you will see I have done in many problems discussed later in this book). Thus, while appearing to live like 30
those concerned only to lead an agreeable and blameless life, who take care to keep their pleasures free from vices, and who engage in every

honest pastime in order to enjoy their leisure without boredom, I never stopped pursuing my project, and I made perhaps more progress in the knowledge of the truth than I would have if I had done nothing but read books or mix with men of letters.

Those nine years passed by, however, without my taking any side regarding the questions which are commonly debated among the learned, or beginning to search for the foundations of any philosophy more certain than the commonly accepted one. The example of many fine intellects who had previously had this project, but had not, I thought, met with success, made me imagine the difficulties to be so great that I would not have dared to embark upon it so soon if I had not noticed that some people were spreading the rumour that I had already completed it. I cannot say what basis they had for this opinion. If I contributed anything to it by my conversation, it must have been because I confessed my ignorance more ingenuously than is customary for those with a little learning, and perhaps also because I displayed the reasons I had for doubting many things which others regard as certain, rather than because I boasted of some learning. But as I was honest enough not to wish to be taken for what I was not, I thought I had to try by every means to become
31 worthy of the reputation that was given me. Exactly eight years ago this desire made me resolve to move away from any place where I might have acquaintances and retire to this country, where the long duration of the war has led to the establishment of such order that the armies maintained here seem to serve only to make the enjoyment of the fruits of peace all the more secure.[1] Living here, amidst this great mass of busy people who are more concerned with their own affairs than curious about those of others, I have been able to lead a life as solitary and withdrawn as if I were in the most remote desert, while lacking none of the comforts found in the most populous cities.

Part Four

I do not know whether I should tell you of the first meditations that I had there, for they are perhaps too metaphysical and uncommon for everyone's taste. And yet, to make it possible to judge whether the foundations I have chosen are firm enough, I am in a way obliged to speak of them. For a long time I had observed, as noted above, that in practical life it is sometimes necessary to act upon opinions which one knows to be quite uncertain just as if they were indubitable. But since I now wished to devote myself solely to the search for truth, I thought it necessary to do

1 Descartes settled in Holland in 1629. The war was that conducted by the United Provinces against Spain from 1572 to 1648.

the very opposite and reject as if absolutely false everything in which I could imagine the least doubt, in order to see if I was left believing anything that was entirely indubitable. Thus, because our senses sometimes deceive us, I decided to suppose that nothing was such as they led us to imagine. And since there are men who make mistakes in reasoning, committing logical fallacies concerning the simplest questions in geometry, and because I judged that I was as prone to error as anyone else, I rejected as unsound all the arguments I had previously taken as demonstrative proofs. Lastly, considering that the very thoughts we have while awake may also occur while we sleep without any of them being at the that time true, I resolved to pretend that all the things that had ever entered my mind were no more true than the illusions of my dreams. But immediately I noticed that while I was trying thus to think everything false, it was necessary that I, who was thinking this, was something. And observing that this truth '*I am thinking, therefore I exist*' was so firm and sure that all the most extravagant suppositions of the sceptics were incapable of shaking it, I decided that I could accept it without scruple as the first principle of the philosophy I was seeking. 32

Next I examined attentively what I was. I saw that while I could pretend that I had no body and that there was no world and no place for me to be in, I could not for all that pretend that I did not exist. I saw on the contrary that from the mere fact that I thought of doubting the truth of other things, it followed quite evidently and certainly that I existed; whereas if I had merely ceased thinking, even if everything else I had ever imagined had been true, I should have had no reason to believe that I existed. From this I knew I was a substance whose whole essence or nature is simply to think, and which does not require any place, or depend on any material thing, in order to exist. Accordingly this 'I' – that is, the soul by which I am what I am – is entirely distinct from the body, and indeed is easier to know than the body, and would not fail to be whatever it is, even if the body did not exist. 33

After this I considered in general what is required of a proposition in order for it to be true and certain; for since I had just found one that I knew to be such, I thought that I ought also to know what this certainty consists in. I observed that there is nothing at all in the proposition '*I am thinking, therefore I exist*' to assure me that I am speaking the truth, except that I see very clearly that in order to think it is necessary to exist. So I decided that I could take it as a general rule that the things we conceive very clearly and very distinctly are all true; only there is some difficulty in recognizing which are the things that we distinctly conceive.

Next, reflecting upon the fact that I was doubting and that consequently my being was not wholly perfect (for I saw clearly that it is a

greater perfection to know than to doubt), I decided to inquire into the source of my ability to think of something more perfect than I was; and I
34 recognized very clearly that this had to come from some nature that was in fact more perfect. Regarding the thoughts I had of many other things outside me, like the heavens, the earth, light, heat and numerous others, I had no such difficulty in knowing where they came from. For I observed nothing in them that seemed to make them superior to me; and so I could believe that, if they were true, they depended on my nature in so far as it had any perfection, and if they were not true, I got them from nothing – in other words, they were in me because I had some defect. But the same could not hold for the idea of a being more perfect than my own. For it was manifestly impossible to get this from nothing; and I could not have got it from myself since it is no less contradictory that the more perfect should result from the less perfect, and depend on it, than that something should proceed from nothing. So there remained only the possibility that the idea had been put into me by a nature truly more perfect than I was and even possessing in itself all the perfections of which I could have any idea, that is – to explain myself in one word – by God. To this I added that since I knew of some perfections that I did not possess, I was not the only being which existed (here, by your leave, I shall freely use some scholastic terminology), but there had of necessity to be some other, more perfect being on which I depended and from which I had acquired all that I possessed. For if I had existed alone and independently of every other
35 being, so that I had got from myself what little of the perfect being I participated in, then for the same reason I could have got from myself everything else I knew I lacked, and thus been myself infinite, eternal, immutable, omniscient, omnipotent; in short, I could have had all the perfections which I could observe to be in God. For, according to the arguments I have just advanced, in order to know the nature of God, as far as my own nature was capable of knowing it, I had only to consider, for each thing of which I found in myself some idea, whether or not it was a perfection to possess it; and I was sure that none of those which indicated any imperfection was in God, but that all the others were. Thus I saw that doubt, inconstancy, sadness and the like could not be in God, since I myself would have been very glad to be free from them. Besides this, I had ideas of many corporeal things capable of being perceived by the senses; for even if I were to suppose that I was dreaming and that whatever I saw or imagined was false, yet I could not deny that the ideas were truly in my mind. But since I had already recognized very clearly from my own case that the intellectual nature is distinct from the corporeal, and as I observed that all composition is evidence of dependence and that dependence is manifestly a defect, I concluded that it could

not be a perfection in God to be composed of these two natures, and consequently that he was not composed of them. But if there were any bodies in the world, or any intelligences or other natures that were not wholly perfect, their being must depend on God's power in such a 36
manner that they could not subsist for a single moment without him.

After that, wishing to seek other truths, I considered the object studied by geometers. I conceived of this as a continuous body, or a space indefinitely extended in length, breadth and height or depth, and divisible into different parts which may have various shapes and sizes, and may be moved or transposed in every way: for all this is assumed by geometers in their object of study. I went through some of their simpler demonstrations and noted that the great certainty which everyone ascribes to them is founded solely on their being conceived as evident (in accordance with the rule stated above). I noted also that there was nothing at all in these demonstrations which assured me of the existence of their object. For example, I saw clearly that the three angles of any given triangle must equal two right angles; yet for all that, I saw nothing which assured me that there existed any triangle in the world. Whereas when I looked again at the idea I had of a perfect being, I found that this included existence in the same way as – or even more evidently than – the idea of a triangle includes the equality of its three angles to two right angles, or the idea of a sphere includes the equidistance of all the points on the surface from the centre. Thus I concluded that it is at least as certain as any geometrical proof that God, who is this perfect being, is or exists.

But many are convinced that there is some difficulty in knowing God, 37
and even in knowing what their soul is. The reason for this is that they never raise their minds above things which can be perceived by the senses: they are so used to thinking of things only by imagining them (a way of thinking specially suited to material things) that whatever is unimaginable seems to them unintelligible. This is sufficiently obvious from the fact that even the scholastic philosophers take it as a maxim that there is nothing in the intellect which has not previously been in the senses; and yet it is certain that the ideas of God and of the soul have never been in the senses. It seems to me that trying to use one's imagination in order to understand these ideas is like trying to use one's eyes in order to hear sounds or smell odours – though there is this difference, that the sense of sight gives us no less assurance of the reality of its objects than do the senses of smell and hearing, while neither our imagination nor our senses could ever assure us of anything without the intervention of our intellect.

Finally, if there are still people who are not sufficiently convinced of the existence of God and of their soul by the arguments I have proposed,

I would have them know that everything else of which they may think themselves more sure – such as their having a body, there being stars and an earth, and the like – is less certain. For although we have a moral
38 certainty[1] about these things, so that it seems we cannot doubt them without being extravagant, nevertheless when it is a question of metaphysical certainty, we cannot reasonably deny that there are adequate grounds for not being entirely sure about them. We need only observe that in sleep we may imagine in the same way that we have a different body and see different stars and a different earth, without there being any of these things. For how do we know that the thoughts which come to us in dreams are any more false than the others, seeing that they are often no less lively and distinct? However much the best minds study this question, I do not believe they will be able to give any reason sufficient to remove this doubt unless they presuppose the existence of God. For in the first place, what I took just now as a rule, namely that everything we conceive very clearly and very distinctly is true, is assured only for the reasons that God is or exists, that he is a perfect being, and that everything in us comes from him. It follows that our ideas or notions, being real things and coming from God, cannot be anything but true, in every respect in which they are clear and distinct. Thus, if we frequently have ideas containing some falsity, this can happen only because there is something confused and obscure in them, for in that respect they participate in nothingness, that is, they are in us in this confused state only because we are not wholly perfect. And it is evident that it is no less
39 contradictory that falsity or imperfection as such should proceed from God than that truth or perfection should proceed from nothingness. But if we did not know that everything real and true within us comes from a perfect and infinite being then, however clear and distinct our ideas were, we would have no reason to be sure that they had the perfection of being true.

But once the knowledge of God and the soul has made us certain of this rule, it is easy to recognize that the things we imagine in dreams should in no way make us doubt the truth of the thoughts we have when awake. For if one happened even in sleep to have some very distinct idea (if, say, a geometer devised some new proof), one's being asleep would not prevent the idea from being true. And as to 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 this gives us occasion to doubt the truth of such ideas, for often they can also mislead us without our being asleep – as when those with jaundice see

1 See footnote 2, p. 289 below.

everything coloured yellow, or when stars or other very distant bodies appear to us much smaller than they are. For after all, whether we are awake or asleep, we ought never to let ourselves be convinced except by the evidence of our reason. It will be observed that I say 'our reason', not 'our imagination' or 'our senses'. Even though we see the sun very 40
clearly, we must not judge on that account that it is only as large as we see it; and we can distinctly imagine a lion's head on a goat's body without having to conclude from this that a chimera exists in the world. For reason does not insist that what we thus see or imagine is true. But it does insist that all our ideas or notions must have some foundation of truth; for otherwise it would not be possible that God, who is all-perfect and all-truthful, should have placed them in us. And our reasonings are never so evident or complete in sleep as in waking life, although sometimes our imaginings in sleep are as lively and distinct as in waking life, or more so. Hence reason also demands that, since our thoughts cannot all be true because we are not wholly perfect, what truth they do possess must inevitably be found in the thoughts we have when awake, rather than in our dreams.

Part Five

I would gladly go on and reveal the whole chain of other truths that I deduced from these first ones. But in order to do this I would have to discuss many questions that are being debated among the learned, and I do not wish to quarrel with them. So it will be better, I think, for me not to do this, and merely to say in general what these questions are, so as to let those who are wiser decide whether it would be useful for the public to be informed more specifically about them. I have always remained firm 41
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 which did not seem to me clearer and more certain than the demonstrations of the geometers had hitherto seemed. And yet I venture to say that I have found a way to satisfy myself within a short time about all the principal difficulties usually discussed in philosophy. What is more, I have noticed certain laws which God has so established in nature, and of which he has implanted such notions in our minds, that after adequate reflection we cannot doubt that they are exactly observed in everything which exists or occurs in the world. Moreover, by considering what follows from these laws it seems to me that I have discovered many truths more useful and important than anything I had previously learned or even hoped to learn.

I endeavoured to explain the most important of these truths in a

treatise which certain considerations prevent me from publishing, and I know of no better way to make them known than by summarizing its contents.[1] My aim was to include in it everything I thought I knew about the nature of material things before I began to write it. Now a painter cannot represent all the different sides of a solid body equally well on his flat canvas, and so he chooses one of the principal ones, sets it facing the
42 light, and shades the others so as to make them stand out only when viewed from the perspective of the chosen side. In just the same way, fearing that I could not put everything I had in mind into my discourse, I undertook merely to expound quite fully what I understood about light. Then, as the occasion arose, I added something about the sun and fixed stars, because almost all light comes from them; about the heavens, because they transmit light; about planets, comets and the earth, because they reflect light; about terrestrial bodies in particular, because they are either coloured or transparent or luminous; and finally about man, because he observes these bodies. But I did not want to bring these matters too much into the open, for I wished to be free to say what I thought about them without having either to follow or to refute the accepted opinions of the learned. So I decided to leave our world wholly for them to argue about, and to speak solely of what would happen in a new world. I therefore supposed that God now created, somewhere in imaginary spaces, enough matter to compose such a world; that he variously and randomly agitated the different parts of this matter so as to form a chaos as confused as any the poets could invent; and that he then did nothing but lend his regular concurrence to nature, leaving it to act according to the laws he established. First of all, then, I described this matter, trying to represent it so that there is absolutely nothing, I think, which is clearer and more intelligible, with the exception of what has just
43 been said about God and the soul. In fact I expressly supposed that this matter lacked all those forms or qualities about which they dispute in the Schools, and in general that it had only those features the knowledge of which was so natural to our souls that we could not even pretend not to know them. Further, I showed what the laws of nature were, and without basing my arguments on any principle other than the infinite perfections of God, I tried to demonstrate all those laws about which we could have any doubt, and to show that they are such that, even if God created many worlds, there could not be any in which they failed to be observed. After this, I showed how, in consequence of these laws, the greater part of the matter of this chaos had to become disposed and arranged in a certain way, which made it resemble our heavens; and how, at the same time,

1 The treatise of which *The World* and the *Treatise on Man* are parts. See pp. 79–108 above.

some of its parts had to form an earth, some planets and comets, and others a sun and fixed stars. Here I dwelt upon the subject of light, explaining at some length the nature of the light that had to be present in the sun and the stars, how from there it travelled instantaneously across the immense distances of the heavens, and how it was reflected from the planets and comets to the earth. To this I added many points about the substance, position, motions and all the various qualities of these heavens and stars; and I thought I had thereby said enough to show that for anything observed in the heavens and stars of our world, something wholly similar had to appear, or at least could appear, in those of the world I was describing. From that I went on to speak of the earth in 44
particular: how, although I had expressly supposed that God had put no gravity into the matter of which it was formed, still all its parts tended exactly towards its centre; how, there being water and air on its surface, the disposition of the heavens and heavenly bodies (chiefly the moon), had to cause an ebb and flow similar in all respects to that observed in our seas, as well as a current of both water and air from east to west like the one we observe between the tropics; how mountains, seas, springs and rivers could be formed naturally there, and how metals could appear in mines, plants grow in fields, and generally how all the bodies we call 'mixed' or 'composite' could come into being there. Among other things, I took pains to make everything belonging to the nature of fire very clearly understandable, because I know nothing else in the world, apart from the heavenly bodies, that produces light. Thus I made clear how it is formed and fuelled, how sometimes it possesses only heat without light, and sometimes light without heat; how it can produce different colours and various other qualities in different bodies; how it melts some bodies and hardens others; how it can consume almost all bodies, or turn them into ashes and smoke; and finally how it can, by the mere force of its action, form glass from these ashes – something I took particular 45
pleasure in describing since it seems to me as wonderful a transmutation as any that takes place in nature.

Yet I did not wish to infer from all this that our world was created in the way I proposed, for it is much more likely that from the beginning God made it just as it had to be. But it is certain, and it is an opinion commonly accepted among theologians, that the act by which God now preserves it is just the same as that by which he created it. So, even if in the beginning God had given the world only the form of a chaos, provided that he established the laws of nature and then lent his concurrence to enable nature to operate as it normally does, we may believe without impugning the miracle of creation that by this means alone all purely material things could in the course of time have come to

be just as we now see them. And their nature is much easier to conceive if we see them develop gradually in this way than if we consider them only in their completed form.

From the description of inanimate bodies and plants I went on to describe animals, and in particular men. But I did not yet have sufficient knowledge to speak of them in the same manner as I did of the other things – that is, by demonstrating effects from causes and showing from what seeds and in what manner nature must produce them. So I contented myself with supposing that God formed the body of a man
46 exactly like our own both in the outward shape of its limbs and in the internal arrangement of its organs, using for its composition nothing but the matter that I had described. I supposed, too, that in the beginning God did not place in this body any rational soul or any other thing to serve as a vegetative or sensitive soul, but rather that he kindled in its heart one of those fires without light which I had already explained, and whose nature I understood to be no different from that of the fire which heats hay when it has been stored before it is dry, or which causes new wine to seethe when it is left to ferment from the crushed grapes. And when I looked to see what functions would occur in such a body I found precisely those which may occur in us without our thinking of them, and hence without any contribution from our soul (that is, from that part of us, distinct from the body, whose nature, as I have said previously, is simply to think). These functions are just the ones in which animals without reason may be said to resemble us. But I could find none of the functions which, depending on thought, are the only ones that belong to us as men; though I found all these later on, once I had supposed that God created a rational soul and joined it to this body in a particular way which I described.

But so that you might see how I dealt with this subject, I shall give my explanation of the movement of the heart and the arteries. Being the first and most widespread movement that we observe in animals, it will
47 readily enable us to decide how we ought to think about all the others. But first, so there may be less difficulty in understanding what I shall say, I should like anyone unversed in anatomy to take the trouble, before reading this, to have the heart of some large animal with lungs dissected before him (for such a heart is in all respects sufficiently like that of a man), and to be shown the two chambers or cavities which are present in it. First, there is the cavity on the right, to which two very large tubes are connected: these are the vena cava, which is the principal receptacle of the blood and is like the trunk of a tree of which all the other veins of the body are the branches; and the arterial vein (ill-named because it is really an artery), which originates in the heart and after leaving it divides into

many branches that spread throughout the lungs. Then there is the cavity on the left, likewise connected to two tubes which are as large as the others or even larger: the venous artery (also ill-named because it is nothing but a vein), which comes from the lungs where it is divided into many branches intertwined with those of the arterial vein and with those of the windpipe (as it is called) through which the air we breathe enters; and the great artery which goes out from the heart and sends its branches throughout the body. I should also like the reader to be shown the eleven little membranes which, like so many little doors, open and close the four openings within these two cavities. Three are situated at the entrance to 48
the vena cava in such a way that they cannot prevent the blood contained in it from flowing into the right-hand cavity, and yet they effectively prevent it from flowing out. Three at the entrance to the arterial vein do just the opposite, readily permitting the blood in the right-hand cavity to pass into the lungs, but not permitting the blood in the lungs to return into it. Likewise two others at the entrance to the venous artery allow the blood in the lungs to flow into the left-hand cavity of the heart, but block its return; and three at the entrance to the great artery permit blood to leave the heart but prevent it from returning. There is no need to seek any reason for the number of these membranes beyond the fact that the opening to the venous artery, being oval because of its location, can easily be closed with two of them, whereas the other openings, being round, can be closed more effectively with three. I should like the reader also to observe that the great artery and the arterial vein have a much harder and firmer composition than the venous artery and the vena cava, and that the latter widen out before entering the heart to form two pouches, called the auricles, which are composed of flesh similar to that of the heart. He will observe 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 causing a drop of blood to swell and expand as soon as it enters a 49
cavity of the heart, just as liquids generally do when they are poured drop by drop into some vessel which is very hot.

After that, I need say little in order to explain the movement of the heart. When its cavities are not full of blood, some blood necessarily flows from the vena cava into the right-hand cavity and from the venous artery into the left-hand cavity, for these two vessels are always full of blood and their entrances, which open into the heart, cannot be blocked. But as soon as two drops of blood have entered the heart in this way, one in each of its cavities, these drops, which must be very large because the openings through which they enter are very wide and the vessels from which they come are very full of blood, are rarefied and expand because of the heat they find there. In this way they make the whole heart swell,

and they push against and close the five little doors at the entrance to the two vessels from which they come, thus preventing any more blood from descending to the heart. Continuing to become more and more rarefied, they push open the six other little doors at the entrance to the other two vessels, going out through them and thereby causing all the branches of the arterial vein and of the great artery to swell almost at the same instant as the heart. Immediately afterwards, the heart contracts, as do these arteries as well, because the blood that entered them grows cold, and their six little doors close again while the five doors of the vena cava and
50 the venous artery reopen and allow the passage of two further drops of blood, which immediately makes the heart and the arteries swell, exactly as before. And it is because the blood thus entering the heart passes through the two pouches called the auricles that their movement is contrary to that of the heart, and they contract when it swells. Now those who are ignorant of the force of mathematical demonstrations and unaccustomed to distinguishing true reasons from probable may be tempted to reject this explanation without examining it. To prevent this, I would advise them that the movement I have just explained follows from the mere arrangement of the parts of the heart (which can be seen with the naked eye), from the heat in the heart (which can be felt with the fingers), and from the nature of the blood (which can be known through observation). This movement follows just as necessarily as the movement of a clock follows from the force, position, and shape of its counterweights and wheels.

One may ask, however, why the blood in the veins is not used up as it flows continually into the heart, and why the arteries are never too full of blood, since all the blood that passes through the heart flows through them. To this I need give no reply other than that already published by an English physician, who must be praised for having broken the ice on this subject.[1] He is the first to teach that there are many small passages at the extremities of the arteries, through which the blood they receive from the heart enters the small branches of the veins, from there going immediately back to the heart, so that its course is nothing but a
51 perpetual circulation. He proves this very effectively by reference to the normal practice of surgeons, who bind an arm moderately tightly above a vein they have opened, so as to make the blood flow out more abundantly than if they had not bound the arm. But just the opposite happens if they bind the arm below, between the hand and the opening, or even if they bind it very tightly above the opening. For it is obvious that a moderately tight tourniquet can prevent the blood that is already

1 William Harvey (1578–1657), whose book on the circulation of the blood, *De Motu Cordis*, was published in 1628 and read by Descartes in 1632.

in the arm from returning to the heart through the veins, but does not prevent fresh blood from coming through the arteries. There are two reasons for this: first, the arteries are situated below the veins and their walls are harder and hence less easily compressed; and second, the blood which comes from the heart tends to flow through the arteries to the hand with more force than it does in returning to the heart through the veins. And since this blood comes out of the arm through an opening in one of the veins, there must necessarily be some passages below the tourniquet (that is, towards the extremity of the arm) through which it may flow from the arteries. Harvey also proves very soundly what he says about the circulation of the blood by pointing to certain small membranes which are arranged in various places along the veins in such a way that they do not permit the blood to pass from the middle of the body towards the extremities but only let it return from the extremities towards the heart. He proves his theory, moreover, by an experiment which shows that all the blood in the body can flow out of it in a very short time through a single artery, even if the artery is tightly bound close to the heart and cut between the heart and the tourniquet so that no one 52
could have any reason to imagine that the blood drained off comes from anywhere but the heart.

But there are many other facts which prove that the true cause of this movement of the blood is the one I have given.[1] First, there is the difference we see between the blood which flows from the veins and that which flows from the arteries. This can result only from the fact that the blood is rarefied and, as it were, distilled in passing through the heart, and is therefore thinner, livelier and warmer just after leaving it (that is, when in the arteries) than a little before entering it (that is, when in the veins). And if you look closely you will find this difference to be more evident near the heart than in places further from it. Then there is the hardness of the membranes of which the arterial vein and the great artery are composed: this shows well enough that the blood strikes against them with more force than against the veins. And why should the left-hand cavity of the heart and the great artery be larger and wider than the right-hand cavity and the arterial vein, if not because the blood in the venous artery, having been only in the lungs after passing through the heart, is thinner and more easily rarefied than that which comes immediately from the vena cava? And what could physicians learn by feeling the pulse if they did not know that, as the nature of the blood changes, 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

1 See *Description of the Human Body* (below, pp. 316ff) for Descartes' criticism of Harvey's explanation of the movement of the blood.

communicated to the other parts of the body, must we not acknowledge
53 that this happens by means of the blood, which is reheated in passing through the heart and spreads from there through the whole body? So it is that if we remove the blood from some part of the body, we thereupon remove the heat as well; and even if the heart were as hot as glowing iron, it would not be able to reheat the feet and the hands as it does unless it continually sent new blood to these parts. Then, too, we know from this that the true function of respiration is to bring enough fresh air into the lungs to cause the blood entering there from the right-hand cavity of the heart, where it has been rarefied and almost changed into vapours, to thicken immediately into blood again before returning to the left-hand cavity. For if this did not happen the blood would not be fit to serve as fuel for the fire in the heart. This is confirmed by seeing that animals without lungs have only one cavity in their hearts, and that unborn children, who cannot use their lungs while enclosed within their mother's womb, have an opening through which blood flows from the vena cava into the left-hand cavity of the heart, and a tube through which blood comes from the arterial vein into the great artery without passing through the lungs. Again, how would digestion take place in the stomach if the heart did not send heat there through the arteries, together with some of the most fluid parts of the blood which help to dissolve the food we have put there? And is it not easy to understand the action that converts the juice of this food into blood, if we consider that the blood passing in and out of the heart is distilled perhaps more than one or two
54 hundred times each day? Again, what more do we need in order to explain nutrition and the production of the various humours present in the body? We need only say that as the blood is rarefied it flows with such force from the heart towards the extremities of the arteries that some of its parts come to rest in parts of the body where they drive out and displace other parts of the blood; and certain parts of the blood flow to some places rather than others according to the situation, shape, or minuteness of the pores that they encounter, just as sieves with holes of various sizes serve to separate different grains from each other. But the most remarkable of all these facts is the generation of the animal spirits: like a very fine[1] wind, or rather a very pure and lively flame, they rise continuously in great abundance from the heart into the brain, passing from there through the nerves to the muscles and imparting movement to all the parts of the body. The parts of the blood which are the most agitated and penetrating, and hence the best suited to compose these spirits, make their way to the brain rather than elsewhere. For this we

1 See footnote 2, p. 100 above.

need suppose no cause other than the fact that they are carried there by the arteries which come most directly from the heart. For according to the laws of mechanics, which are identical with the laws of nature, when many things tend to move together towards a place where there is not enough room for all of them (as when the parts of blood coming from the left-hand cavity of the heart all tend towards the brain), the weakest and 55
least agitated must be pushed aside by the strongest, which thus arrive at that place on their own.

I explained all these matters in sufficient detail in the treatise I previously intended to publish.[1] And then I showed what structure the nerves and muscles of the human body must have in order to make the animal spirits inside them strong enough to move its limbs – as when we see severed heads continue to move about and bite the earth although they are no longer alive. I also indicated what changes must occur in the brain in order to cause waking, sleep and dreams; how light, sounds, smells, tastes, heat and the other qualities of external objects can imprint various ideas on the brain through the mediation of the senses; and how hunger, thirst, and the other internal passions can also send their ideas there. And I explained which part of the brain must be taken to be the 'common' sense,[2] where these ideas are received; the memory, which preserves them; and the corporeal imagination, which can change them in various ways, form them into new ideas, and, by distributing the animal spirits to the muscles, make the parts of this body move in as many different ways as the parts of our bodies can move without being guided by the will, and in a manner which is just as appropriate to the objects of the senses and the internal passions. This will not seem at all strange to those who know how many kinds of automatons, or moving machines, the skill of man can construct with the use of very few parts, in 56
comparison with the great multitude of bones, muscles, nerves, arteries, veins and all the other parts that are in the body of any animal. For they will regard this body as a machine which, having been made by the hands of God, is incomparably better ordered than any machine that can be devised by man, and contains in itself movements more wonderful than those in any such machine.

I made special efforts to show that if any such machines had the organs and outward shape of a monkey or of some other animal that lacks reason, we should have no means of knowing that they did not possess entirely the same nature as these animals; whereas if any such machines bore a resemblance to our bodies and imitated our actions as closely as possible for all practical purposes, we should still have two very certain

1 See footnote p. 132, above.
2 Cf. *Rules*, above p. 41, and *Treatise on Man*, above pp. 104ff.

means of recognizing that they were not real men. The first is that they could never use words, or put together other signs, as we do in order to declare our thoughts to others. For we can certainly conceive of a machine so constructed that it utters words, and even utters words which correspond to bodily actions causing a change in its organs (e.g. if you touch it in one spot it asks what you want of it, if you touch it in another it cries out that you are hurting it, and so on). But it is not conceivable that such a machine should produce different arrangements of words so
57 as to give an appropriately meaningful answer to whatever is said in its presence, as the dullest of men can do. Secondly, even though such machines might do some things as well as we do them, or perhaps even better, they would inevitably fail in others, which would reveal that they were acting not through understanding but only from the disposition of their organs. For whereas reason is a universal instrument which can be used in all kinds of situations, these organs need some particular disposition for each particular action; hence it is for all practical purposes impossible for a machine to have enough different organs to make it act in all the contingencies of life in the way in which our reason makes us act.

Now in just these two ways we can also know the difference between man and beast. For it is quite remarkable that there are no men so dull-witted or stupid – and this includes even madmen – that they are incapable of arranging various words together and forming an utterance from them in order to make their thoughts understood; whereas there is no other animal, however perfect and well-endowed it may be, that can do the like. This does not happen because they lack the necessary organs, for we see that magpies and parrots can utter words as we do, and yet they cannot speak as we do: that is, they cannot show that they are thinking what they are saying. On the other hand, men born deaf and
58 dumb, and thus deprived of speech-organs as much as the beasts or even more so, normally invent their own signs to make themselves understood by those who, being regularly in their company, have the time to learn their language. This shows not merely that the beasts have less reason than men, but that they have no reason at all. For it patently requires very little reason to be able to speak; and since as much inequality can be observed among the animals of a given species as among human beings, and some animals are more easily trained than others, it would be incredible that a superior specimen of the monkey or parrot species should not be able to speak as well as the stupidest child – or at least as well as a child with a defective brain – if their souls were not completely different in nature from ours. And we must not confuse speech with the natural movements which express passions and which can be imitated by

machines as well as by animals. Nor should we think, like some of the ancients, that the beasts speak, although we do not understand their language. For if that were true, then since they have many organs that correspond to ours, they could make themselves understood by us as well as by their fellows. It is also a very remarkable fact that although many animals show more skill than we do in some of their actions, yet the same animals show none at all in many others; so what they do better does not prove that they have any intelligence, for if it did then they would have more intelligence than any of us and would excel us in everything. It 59
proves rather that they have no intelligence at all, and that it is nature which acts in them according to the disposition of their organs. In the same way a clock, consisting only of wheels and springs, can count the hours and measure time more accurately than we can with all our wisdom.

After that, I described the rational soul, and showed that, unlike the other things of which I had spoken, it cannot be derived in any way from the potentiality of matter, but must be specially created.[1] And I showed how it is not sufficient for it to be lodged in the human body like a helmsman in his ship, except perhaps to move its limbs, but that it must be more closely joined and united with the body in order to have, besides this power of movement, feelings and appetites like ours and so constitute a real man. Here I dwelt a little upon the subject of the soul, because it is of the greatest importance. For after the error of those who deny God, which I believe I have already adequately refuted, there is none that leads weak minds further from the straight path of virtue than that of imagining that the souls of the beasts are of the same nature as ours, and hence that after this present life we have nothing to fear or to hope for, any more than flies and ants. But when we know how much the beasts differ from us, we understand much better the arguments 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. And since we cannot see 60
any other causes which destroy the soul, we are naturally led to conclude that it is immortal.

Part Six

It is now three years since I reached the end of the treatise that contains all these things. I was beginning to revise it in order to put it in the hands of a publisher, when I learned that some persons to whom I defer and who have hardly less authority over my actions than my own reason has over my thoughts, had disapproved of a physical theory published a little

1 The section of the *Treatise on Man* referred to here has not survived.

while before by someone else.[1] I will not say that I accepted this theory, but only that before their condemnation I had noticed nothing in it that I could imagine to be prejudicial either to religion or to the state, and hence nothing that would have prevented me from publishing it myself, if reason had convinced me of it. This made me fear that there might be some mistake in one of my own theories, in spite of the great care I had always taken never to adopt any new opinion for which I had no certain demonstration, and never to write anything that might work to anyone's disadvantage. That was enough to make me change my previous decision to publish my views. For although I had had very strong reasons for this decision, my inclination, which has always made me dislike the business of writing books, prompted me to find excuses enough for deciding
61 otherwise. The reasons, on one side and the other, are such that not only do I have some interest in stating them here, but also the public may be interested to know what they are.

I have never made much of the products of my own mind; and so long as the only fruits I gathered from the method I use were my own satisfaction regarding certain difficulties in the speculative sciences, or else my attempts to govern my own conduct by the principles I learned from it, I did not think I was obliged to write anything about it. For as regards conduct, everyone is so full of his own wisdom that we might find as many reformers as heads if permission to institute change in these matters were granted to anyone other than those whom God has set up as sovereigns over his people or those on whom he has bestowed sufficient grace and zeal to be prophets. As regards my speculations, although they pleased me very much, I realized that other people had their own which perhaps pleased them more. But as soon as I had acquired some general notions in physics and had noticed, as I began to test them in various particular problems, where they could lead and how much they differ from the principles used up to now, I believed that I could not keep them secret without sinning gravely against the law which obliges us to do all in our power to secure the general welfare of mankind. For they opened my eyes to the possibility of gaining knowledge which would be very useful in life, and of discovering a practical philosophy which might
62 replace the speculative philosophy taught in the schools. Through this philosophy we could know the power and action of fire, water, air, the stars, the heavens and all the other bodies in our environment, as distinctly as we know the various crafts of our artisans; and we could use this knowledge – as the artisans use theirs – for all the purposes for which it is appropriate, and thus make ourselves, as it were, the lords and

1 Galileo, whose *Dialogue Concerning the Two Chief World Systems* was published in 1632 and condemned by the Congregation of the Holy Office in 1633.

masters of nature. This is desirable not only for the invention of innumerable devices which would facilitate our enjoyment of the fruits of the earth and all the goods we find there, but also, and most importantly, for the maintenance of health, which is undoubtedly the chief good and the foundation of all the other goods in this life. For even the mind depends so much on the temperament and disposition of the bodily organs that if it is possible to find some means of making men in general wiser and more skilful than they have been up till now, I believe we must look for it in medicine. It is true that medicine as currently practised does not contain much of any significant use; but without intending to disparage it, I am sure there is no one, even among its practitioners, who would not admit that all we know in medicine is almost nothing in comparison with what remains to be known, and that we might free ourselves from innumerable diseases, both of the body and of the mind, and perhaps even from the infirmity of old age, if we had sufficient knowledge of their causes and of all the remedies that nature has provided. Intending as I did to devote my life to the pursuit of such 63
indispensable knowledge, I discovered a path which would, I thought, inevitably lead one to it, unless prevented by the brevity of life or the lack of observations.[1] And I judged that the best remedy against these two obstacles was to communicate faithfully to the public what little I had discovered, and to urge the best minds to try and make further progress by helping with the necessary observations, each according to his inclination and ability, and by communicating to the public everything they learn. Thus, by building upon the work of our predecessors and combining the lives and labours of many, we might make much greater progress working together than anyone could make on his own.

I also noticed, regarding observations,[1] that the further we advance in our knowledge, the more necessary they become. At the beginning, rather than seeking those which are more unusual and highly contrived, it is better to resort only to those which, presenting themselves spontaneously to our senses, cannot be unknown to us if we reflect even a little. The reason for this is that the more unusual observations are apt to mislead us when we do not yet know the causes of the more common ones, and the factors on which they depend are almost always so special and so minute that it is very difficult to discern them. But the order I have adopted in this regard is the following. First I tried to discover in general the principles or first causes of everything that exists or can exist in the 64
world. To this end I considered nothing but God alone, who created the

1 Fr. *expériences*, a term which Descartes often uses when talking of scientific observations, and which sometimes comes close to meaning 'experiments' in the modern sense (its root being derived from Lat. *experior*, 'to test').

world; and I derived these principles only from certain seeds of truth which are naturally in our souls. Next I examined the first and most ordinary effects deducible from these causes. In this way, it seems to me, I discovered the heavens, the stars, and an earth; and, on the earth, water, air, fire, minerals, and other such things which, being the most common of all and the simplest, are consequently the easiest to know. Then, when I sought to descend to more particular things, I encountered such a variety that I did not think the human mind could possibly 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. Consequently I thought the only way of making these bodies useful to us was to progress to the causes by way of the effects and to make use of many special observations. And now, reviewing in my mind all the objects that have ever been present to my senses, I venture to say that I have never noticed anything in them which I could not explain quite easily by the principles I had discovered. But I must also admit that the power of nature is so ample and so vast, and these principles so simple and so general, that I notice hardly any particular effect of which I do not
65 know at once that it can be deduced from the principles in many different ways; and my greatest difficulty is usually to discover in which of these ways it depends on them. I know no other means to discover this than by seeking further observations whose outcomes vary according to which of these ways provides the correct explanation. Moreover, I have now reached a point where I think I can see quite clearly what line we should follow in making most of the observations which serve this purpose; but I see also that they are of such a kind and so numerous that neither my dexterity nor my income (were it even a thousand times greater than it is) could suffice for all of them. And so the advances I make in the knowledge of nature will depend henceforth on the opportunities I get to make more or fewer of these observations. I resolved to make this known in the treatise I had written, and to show clearly how the public could benefit from such knowledge. This would oblige all who desire the general well-being of mankind – that is, all who are really virtuous, not virtuous only in appearance or merely in repute – both to communicate to me the observations they have already made and to assist me in seeking those which remain to be made.

Since then, however, other considerations have made me change my mind. I have come to think that I must continue writing down anything I consider at all important, when I discover its truth, and that I should take as much care over these writings as I would if I intended to have them
66 published. For this will give me all the more reason to examine them closely, as undoubtedly we always look more carefully at something we

think is to be seen by others than at something we do only for ourselves; and often what seemed true to me when I first conceived it has looked false when I tried to put it on paper. This plan will also ensure both that I lose no opportunity to benefit the public if I can, and that if my writings have any value, those who get them after my death can make the most appropriate use of them. But I was determined not to agree to their publication during my lifetime, so that neither the opposition and controversy they might arouse, nor the reputation they might gain for me, would make me lose any of the time I planned to devote to my self-instruction. Every man is indeed bound to do what he can to procure the good of others, and a man who is of no use to anyone else is strictly worthless. Nevertheless it is also true that our concern ought to extend beyond the present, and that it is good to neglect matters which may profit the living when we aim to do other things which will benefit posterity even more. In any case I am willing to acknowledge that the little I have learned so far is almost nothing in comparison with that which I do not know but which I hope to be able to learn. Those who gradually discover the truth in the sciences are like people who become 67
rich and find they have less trouble making large profits than they had in making much smaller ones when they were poorer. Or they may be compared with military commanders, whose forces tend to grow in proportion to their victories, but who need more skill to maintain their position after losing a battle than they do to take towns and provinces after winning one. For attempting to overcome all the difficulties and errors that prevent our arriving at knowledge of the truth is indeed a matter of fighting battles: we lose a battle whenever we accept some false opinion concerning an important question of general significance, and we need much more skill afterwards to regain our former position than we do to make good progress when we already have principles which are well-founded. For my part, if I have already discovered a few truths in the sciences (and I hope that the contents of this volume warrant the judgement that I have found some), I can say that these discoveries merely result from and depend upon my surmounting of five or six principal difficulties in battles where I reckon I had fortune on my side. I even venture to say that I think I need to win only two or three other such battles in order to achieve my aims completely, and that my age is not so far advanced that I may not in the normal course of nature still have the time to do this. But the more hopeful I am of being able to use my 68
remaining years effectively, the more I think I am obliged to plan my time carefully; and many occasions for wasting time would undoubtedly arise if I published the fundamental principles of my physics. For although these principles are almost all so evident that they need only to be

understood to be believed, and although I think I can demonstrate all of them, yet since it is impossible that they should accord with all the diverse opinions of other men, I foresee that I should often be distracted by the controversies they would arouse.

It may be claimed that such controversies would be useful. Not only would they make me aware of my mistakes, but also they would enable others to have a better understanding of anything worthwhile that I may have discovered; and, as many people are able to see more than one alone, so these others might begin to make use of my discoveries and help me with theirs. But although I recognize that I am extremely prone to error, and I almost never trust the first thoughts that come to me, at the same time my acquaintance with the objections that may be raised prevents me from expecting any benefit from them. For I have already had frequent experience of the judgements both of those I held to be my friends and of some I thought indifferent towards me, and even of certain others whose malice and envy would, I knew, make them eager enough to reveal what affection would hide from my friends. But it has rarely happened that an objection has been raised which I had not wholly
69 foreseen, except when it was quite wide of the mark. Thus I have almost never encountered a critic of my views who did not seem to be either less rigorous or less impartial than myself. Nor have I ever observed that any previously unknown truth has been discovered by means of the disputations practised in the schools. For so long as each side strives for victory, more effort is put into establishing plausibility than in weighing reasons for and against; and those who have long been good advocates do not necessarily go on to make better judges.

As for the benefit that others might gain from the communication of my thoughts, this could not be so very great. For I have not yet taken them sufficiently far: I need to add many things to them before applying them in practice. And I think I can say without vanity that if anyone is capable of making these additions it must be myself rather than someone else – not that there may not be many minds in the world incomparably better than mine, but because no one can conceive something so well, and make it his own, when he learns it from someone else as when he discovers it himself. This is especially true in the case under consideration. I have often explained some of my opinions to highly intelligent persons who seemed to understand them quite distinctly when I told them about them; but, when they repeated them, I observed that they almost always changed them in such a way that I could no longer
70 acknowledge them as my own. For this reason I should like to beg future generations never to believe that I am the source of an opinion they hear unless I have published it myself. I do not wonder at the absurdities

attributed to all the ancient philosophers whose writings we do not possess; nor do I conclude from these attributions that their thoughts were highly unreasonable. As they were some of the best minds of their time, I conclude rather that their thoughts have been misreported. We see too that it has almost never happened that any of their followers has surpassed them; and I am sure that Aristotle's most passionate contemporary followers would count themselves fortunate if they had as much knowledge of nature as he had, even on the condition that they should never know any more. They are like ivy, which never seeks to climb higher than the trees which support it, and often even grows downward after reaching the tree-tops. For it seems to me that they too take downward steps, or become somehow less knowledgeable than if they refrained from study, when, not content with knowing everything which is intelligibly explained in their author's writings, they wish in addition to find there the solution to many problems about which he says nothing and about which perhaps he never thought. But this manner of philosophizing is very convenient for those with only mediocre minds, for the obscurity of the distinctions and principles they use makes it possible for them to speak about everything as confidently as if they knew it, and to defend all they say against the most subtle and clever thinkers without 71
anyone having the means to convince them that they are wrong. In this they seem to resemble a blind man who, in order to fight without disadvantage against someone who can see, lures him into the depths of a very dark cellar. These philosophers, I may say, have an interest in my refraining from publishing the principles of the philosophy I use. For my principles are so very simple and evident that in publishing them I should, as it were, be opening windows and admitting daylight into that cellar where they have gone down to fight. But even the best minds have no reason to wish to know my principles. For if they want to be able to speak about everything and acquire the reputation of being learned, they will achieve this more readily by resting content with plausibility, which can be found without difficulty in all kinds of subjects, than by seeking the truth; for the truth comes to light only gradually in certain subjects, and it obliges us frankly to confess our ignorance where other subjects are concerned. But if they prefer the knowledge of some few truths to the vanity of appearing ignorant of nothing (and undoubtedly the former is preferable), and if they wish to follow a plan similar to mine, then in that case I need tell them nothing more than I have already said in this discourse. For if they are capable of making further progress than I have made, they will be all the more capable of discovering for themselves everything I think I have discovered. Inasmuch as I have examined everything in an orderly manner, it is certain that what still remains for

72 me to discover is in itself more difficult and more hidden than anything I have thus far been able to discover; and they would have much less pleasure in learning it from me than in learning it for themselves. Besides, by investigating easy matters first and then moving on gradually to more difficult ones, they will acquire habits more useful to them than all my instructions could be. For my part, I am convinced that if from my youth I had been taught all the truths I have since sought to demonstrate, and so had learned them without any difficulty, I should perhaps never have known any others; or at least I should never have acquired the habit and facility, which I think I have, for always finding new truths whenever I apply myself in searching for them. In short, if there was ever a task which could not be accomplished so well by someone other than the person who began it, it is the one on which I am working.

True, as regards observations which may help in this work, one man could not possibly make them all. But also he could not usefully employ other hands than his own, except those of artisans, or such persons as he could pay, who would be led by the hope of gain (a most effective motive) to do precisely what he ordered them to do. For voluntary helpers, who might offer to help him from curiosity or a desire to learn, usually promise more than they achieve and make fine proposals which never
73 come to anything. In addition, they would inevitably wish to be rewarded by having certain difficulties explained to them, or at any rate by compliments and useless conversation, which could not but waste a lot of his time. And as for the observations that others have already made, even if they were willing to communicate them to him (something which those who call them 'secrets' would never do), they are for the most part bound up with so many details 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 these observations to be so badly explained or indeed so mistaken – because those who made them were eager to have them appear to conform with their principles – that it would simply not be worthwhile for him to spend the time required to pick out those which he might find useful. So if there were someone in the world whom we knew for sure to be capable of making discoveries of the greatest possible importance and public utility, and whom other men accordingly were eager to help in every way to achieve his ends, I do not see how they could do anything for him except to contribute towards the expenses of the observations that he would need and, further, prevent unwelcome visitors from wasting his free time. But I am not so presumptuous that I wish to promise anything extraordinary, nor do I entertain thoughts so vain as the supposition that the public ought to take a great interest in my projects. Apart from that, I am not so mean-spirited that I would

willingly accept from anyone a favour that I might be thought not to 74
deserve.

All these considerations taken together caused me to decide, three years ago, that I did not wish to publish the treatise I had ready then, and made me resolve not to publish any other work during my lifetime which was so general in scope or by which the foundations of my physics might be understood. Since then, however, two further reasons have compelled me to include here some essays on particular topics and to give to the public some account of my actions and plans. The first is that, if I failed to do so, then many who knew of my earlier intention to publish certain writings might suppose that my reasons for not doing so were more discreditable to me than they are. I am not excessively fond of glory – indeed if I dare to say so, I dislike it in so far as I regard it as opposed to that tranquillity which I value above everything else. At the same time I have never tried to conceal my actions as if they were crimes, or taken many precautions to remain unknown. For if I had done this I thought I would do myself an injustice, and moreover that would have given me a certain sort of disquiet, which again would have been opposed to the perfect peace of mind I am seeking. And since my indifference as to whether I was well-known or not made it unavoidable that I should gain some sort of reputation, I thought I ought to do my best at least to avoid getting a bad one. The other reason compelling me to write this is that 75
every day I am becoming more and more aware of the delay which my project of self-instruction is suffering because of the need for innumerable observations which I cannot possibly make without the help of others. Although I do not flatter myself with any expectation that the public will share my interests, yet at the same time I am unwilling to be so unfaithful to myself as to give those who come after me cause to reproach me some day on the grounds that I could have left them many far better things if I had not been so remiss in making them understand how they could contribute to my projects.

I thought it convenient for me to choose certain subjects which, without being highly controversial and without obliging me to reveal more of my principles than I wished, would nonetheless show quite clearly what I can, and what I cannot, achieve in the sciences. I cannot tell if I have succeeded in this, and I do not wish to anticipate anyone's judgements about my writings by speaking about them myself. But I shall be very glad if they are examined. In order to provide more opportunity for this, I beg all who have any objections to take the trouble to send them to my publisher, and when he informs me about them I shall attempt to append my reply at the same time, so that readers can see both sides together, and decide the truth all the more easily. I do not promise

to make very long replies, but only to acknowledge my errors very
76 frankly if I recognize them; and where I cannot see them I shall simply say what I consider is required for defending what I have written, without introducing any new material, so as to avoid getting endlessly caught up in one topic after another.

Should anyone be shocked at first by some of the statements I make at the beginning of the *Optics* and the *Meteorology* because I call them 'suppositions' and do not seem to care about proving them, let him have the patience to read the whole book attentively, and I trust that he will be satisfied. For I take my reasonings to be so closely interconnected that just as the last are proved by the first, which are their causes, so the first are proved by the last, which are their effects. It must not be supposed that I am here committing the fallacy that the logicians call 'arguing in a circle'. For as experience makes most of these effects quite certain, the causes from which I deduce them serve not so much to prove them as to explain them; indeed, quite to the contrary, it is the causes which are proved by the effects. And I have called them 'suppositions' simply to make it known that I think I can deduce them from the primary truths I have expounded above; but I have deliberately avoided carrying out these deductions in order to prevent certain ingenious persons from taking the opportunity to construct, on what they believe to be my principles, some extravagant philosophy for which I shall be blamed. These persons imagine that they can learn in a single day what it has taken someone else twenty years to think out, as soon as he has told them only two or three words about it; whereas the more penetrating and
77 acute they are, the more prone to error they are and the less capable of truth. As to the opinions that are wholly mine, I do not apologize for their novelty. If the reasons for them are considered well, I am sure they will be found to be so simple and so much in agreement with common sense as to appear less extraordinary and strange than any other views that people may hold on the same subjects. I do not boast of being the first to discover any of them, but I do claim to have accepted them not because they have, or have not, been expressed by others, but solely because reason has convinced me of them.

If artisans are not immediately able to put into operation the invention explained in the *Optics*, I do not think it can on that account be said to be defective.[1] For much skill and practice are needed for making and adjusting the machines I have described, and although my description does not omit any details, I should be no less astonished if they succeeded at the first attempt than if someone could learn to play the lute excellently

1 Here Descartes refers to the method of cutting lenses described in Discourse 10 of the *Optics*.

in a single day simply by being given a good fingering chart. And if I am writing in French, my native language, rather than Latin, the language of my teachers, it is because I expect that those who use only their natural reason in all its purity will be better judges of my opinions than those who give credence only to the writings of the ancients. As to those who combine good sense with application – the only judges I wish to have – I 78
am sure they will not be so partial to Latin that they will refuse to listen to my arguments because I expound them in the vernacular.

For the rest, I do not wish to speak here in detail about the further progress I hope to make in the sciences, or to commit myself in the eyes of the public by making any promise that I am not sure of fulfilling. I will say only that I have resolved to devote the rest of my life to nothing other than trying to acquire some knowledge of nature from which we may derive rules in medicine which are more reliable than those we have had up till now. Moreover, my inclination makes me so strongly opposed to all other projects, and especially to those which can be useful to some persons only by harming others, that if circumstances forced me to engage in any such pursuit, I do not think I would be capable of succeeding in it. Of this I make here a public declaration, fully recognizing that it cannot serve to make me eminent in the world; but then I have no desire to be such. And I shall always hold myself more obliged to those by whose favour I enjoy uninterrupted leisure than to any who might offer me the most honourable positions in the world.