

New Essays on Human Understanding

Book IV: Knowledge

G. W. Leibniz

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[Brackets] enclose editorial explanations. Small ·dots· enclose material that has been added, but can be read as though it were part of the original text. Occasional •bullets, and also indenting of passages that are not quotations, are meant as aids to grasping the structure of a sentence or a thought. Every four-point ellipsis indicates the omission of a brief passage that seems to present more difficulty than it is worth.—Longer omissions are [explained] as they occur. Very small bold unbracketed numerals indicate the corresponding section number in Locke's *Essay*; most of these are provided by Leibniz. This version does not follow Leibniz's practice of always avoiding Locke's name in favour of 'this author', 'our gifted author', etc.

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Chapter i: Knowledge in general

Philaethes: So far we have spoken about •ideas and about the •words that represent them. **1** Let us now turn to the •knowledge that our ideas give us, for ideas are the only things that knowledge has anything to do with. **2** For you to know something is for you to perceive that some two of your ideas have a connection and agreement between them, or a disagreement and mutual inconsistency. Whether we fancy, guess, or believe, that is always *what* we fancy, guess or believe. This is how we are aware, for instance, that white is not black, and that there is a necessary connection between the angles of a triangle and their equality with two right angles.

Theophilus: Knowledge can be taken even more generally, so that it is involved in · less-than-propositional· ideas and terms before we come to propositions and truths. If John looks attentively at more pictures of plants and animals than Henry does, and at more diagrams of machines and descriptions and depictions of houses and fortresses, and if he reads more imaginative novels and listens to more strange stories, then John can be said to have more knowledge than Henry does, even if there isn't a word of truth in anything that he has seen and heard. That's because the practice he has had in portraying in his mind a great many actual, explicit conceptions and ideas makes him better able to conceive what is put to him. He will certainly be better educated, better trained, and more capable than someone who hasn't seen or read or heard anything—provided that •he doesn't take anything in these stories and pictures to be true which really isn't so, and that •these impressions don't prevent him in other contexts from distinguishing the real from the imaginary, the existent from the possible. . . . There

are indeed items that can be said to be midway between an •idea and a •proposition, namely •questions. Some of these ask only for a Yes or a No, and these are the closest to propositions; but there are others that ask how, and ask for details, and so on, and more must be added to these if they are to become propositions. . . . But taking knowledge in the narrower sense of knowledge of the truth, as you do here, I agree that

truth is always grounded in the agreement or disagreement of ideas,

but it is *not* generally the case that

our knowledge of truth is a perception of this agreement and disagreement.

For when we know the truth only in the manner of empirics [see note on page 2], through having experienced it without knowing how things are connected or what principles are at work in what we have experienced, we have no *perception* of that agreement or disagreement, unless · by 'perceive'· you mean that we sense it confusedly without being aware of it. But your examples seem to indicate that you always demand knowledge in which one is *aware of* the connection or opposition · between the two ideas· , and that can't be granted to you. . . . I would add that your definition appears to fit only categorical truths, in which there are two ideas, the subject and the predicate. But there is also knowledge of hypothetical truths and of what can be reduced to them—disjunctions and others—in which there is a connection between the antecedent and consequent •propositions; and so more than two •ideas may be involved.

Phil: Let us restrict ourselves here to knowledge of the truth. And let us apply what will be said about the connections

between ideas to the connections between propositions as well, so as to deal with both categoricals and hypotheticals together. **3** Well, now, I think we may reduce this agreement or disagreement to these four sorts:

- (1) Identity or diversity.
- (2) Relation.
- (3) Coexistence, or necessary connection.
- (4) Real existence.

4 For the mind is immediately aware (1) that one idea is not another, that white is not black. **5** Next, it is aware (2) of their relation when it compares them together—for instance that two triangles on equal basis, between two parallels are equal. [See note on ‘compare’ on page 50.] **6** Then there is (3) coexistence, or rather connectedness; for instance, that fixedness always accompanies the other ideas of gold. **7** Finally there is (4) real existence outside the mind, as when one says: God exists.

Theo: ·Your classification needs to be revised in several respects·. I think we can say that (3) connection is nothing but (2) relation taken in a general sense. And I have already pointed out [page 50] that all relation involves either ·comparison or ·concurrence. Relations of ·comparison yield (1) identity and diversity, in all respects (making things the same or different) or in only some respects (making things alike or unlike). ·Concurrence includes what you call (3) coexistence, i.e. connectedness of existence. But when it is said that (4) something exists or possesses real existence, this existence itself is the predicate; i.e. the notion of existence is linked with the idea in question, and there is a connection between these two notions. Or the existence of the object of an idea may be conceived as the concurrence of that object with myself. [He seems to mean that ‘There are elephants’ means ‘Elephants concur with myself, i.e. exist at the same possible world that I exist at’.] So I believe we can say that ·of your

four categories only (2) relation is basic; splitting it into its two main species we can say that· there is only ·comparison and ·concurrence; but that the comparison that indicates (1) identity or diversity, and the concurrence of the thing with myself ·which is its (4) existence·, are the relations that deserve to be singled out from all the others. One could perhaps carry out a more precise and searching investigation, but at present I confine myself to making comments.

Phil: 8 There is ·actual knowledge, which is the mind’s present perception of the relations between ·two· ideas; and there is ·habitual knowledge, which is what you have when your mind *has been* clearly aware of the agreement or disagreement between two ideas and has stored that proposition in its memory, in such a way that whenever you have occasion to reflect on it you are immediately assured of the truth it contains, without the slightest doubt in the world. We can think clearly and distinctly about only one thing at a time; so if we didn’t allow for habitual knowledge, and held that a man has no knowledge *now* of anything that he isn’t actually thinking about *now*, this would imply that we are all very ignorant and that the person who knew most would know only one truth!

Theo: The fact is that our systematic knowledge, even of the most demonstrative sort, very often has to be gained through a long chain of reasoning, so it has to involve the recollection of a past demonstration that is no longer kept distinctly in mind once the conclusion is reached—otherwise we would be continually repeating the demonstration. This holds good even *within* a single demonstration: while the demonstration is going on we can’t grasp the whole of it all at once, since all its parts can’t be simultaneously present to the mind; and if we continually called the preceding part back into view we would never reach the final one that yields the

conclusion. This, incidentally, implies that without writing it would be difficult to get the sciences properly established, since memory is not certain enough. But having written a long demonstration. . . .and having gone back over all its steps, as one might examine a chain link by link, men can become certain of their reasonings;. . . .and the final result justifies the whole procedure. It can be seen from this that since *all belief consists in the memory of one's past grasp of proofs and reasons*, it's not within our power or our free will to believe or not believe, since memory isn't something that depends on our will.

Phil: 9 We have two sorts of habitual knowledge. (1) In some cases, truths that are laid up in the memory no sooner occur to the mind than it perceives the relation between the ideas that they involve. (2) In other cases, the mind is satisfied with the memory of *having been* convinced, without remembering the proofs and often without even being able to recall them if it wanted to. One might take this to be •belief in one's memory, rather than really •knowing the truth in question; and it used to seem to me to lie somewhere between •opinion and •knowledge—a sort of assurance that exceeds mere belief in reliance on someone else's testimony. But after thinking about it harder I find that it doesn't fall short of perfect certainty. I remember, i.e. I know (for memory is only the reviving of some past thing), that *I was once certain* of the truth of the proposition that the three angles of a triangle are equal to two right ones. Now,

if two things don't change then the relations between them don't change either,

and that •proposition• is the intermediate idea which shows me that

if the three angles of a triangle *were once* equal to two right angles then they still are.

That is the basis on which •particular demonstrations in mathematics provide •general knowledge. Without it, a geometer's knowledge wouldn't reach beyond the particular diagram that he had drawn in giving his demonstration.

Theo: The 'intermediate idea' that you speak of presupposes the reliability of our memory; but it sometimes happens that our memory is deceiving us and that we have *not* taken all necessary care although we think we have. This comes out clearly in the auditing of accounts. [He develops this comparison a little, reporting on a 'method of book-keeping' that he has invented. Then:] All of this plainly shows that men can have rigorous demonstrations on paper—and *do* have an endless number of them, no doubt. But unless we remember having employed perfect rigour, we can't have this certainty in our minds. Now this rigour consists in a rule, obedience to which at each step would provide an assurance regarding the whole. It is like inspecting a chain one link at a time: by examining each one to see that it is unbroken, and using one's hands to make sure not to miss any out, one becomes assured of the soundness of the chain. By this method we achieve all the certainty that human affairs are capable of. But I don't agree with what seems to be your view, that this kind of general certainty is provided in mathematics by particular demonstrations concerning the diagram that has been drawn. You must understand that geometers don't derive their proofs from diagrams. . . . The validity of the demonstration is independent of the diagram, whose only role is to make it easier to understand what is meant and to fix one's attention. It is universal propositions, i.e. definitions and axioms and theorems that have already been demonstrated, that make up the reasoning, and they would sustain it even if there were no diagram. . . .

Chapter ii: The degrees of our knowledge.

Philaethes: 1 Knowledge is *intuitive* when the mind perceives that two ideas agree or disagree, seeing this just by considering them and without help from any third idea serving as a link between them. Intuitive knowledge doesn't involve any work of proving or examining the truth that is known. As *·immediately·* as the eye sees light, the mind perceives that

white is not black,
a circle is not a triangle,
three is one and two.

This knowledge is the clearest and most certain that we humans are capable of. When you have it, it acts in an irresistible manner, leaving your mind no room for hesitation. It is your knowledge that an idea in your mind is as you perceive it to be. Anyone who demands a greater certainty than this doesn't know what he is asking.

Theophilus: Truths that we know by intuition are of two sorts, *primary* and *derivative*, and each of these again divides into two sub-groups—namely *•truths of reason* and *•truths of fact*. Truths of reason are necessary, and those of fact are contingent. The primary truths of reason are the ones I call 'identities' because they seem to do nothing but repeat the same thing without telling us anything. They are either affirmative or negative. Examples of affirmative ones are:

What is, is;
Each thing is what it is,

and as many others as you want:

A is A;
B is B;
I shall be what I shall be;
I have written what I have written.

Say it in prose or say it in rhyme, Nothing is nothing—
most of the time.

An equilateral rectangle is an equilateral rectangle.

And, by truncation:

An equilateral rectangle is a rectangle.

A rational animal is still an animal.

And with hypotheticals:

If a regular four-sided figure is an equilateral rectangle, then it is a rectangle.

Conjunctions, disjunctions and other propositions can likewise be identities. Furthermore, I take affirmatives to include even *Non-A is non-A*. Also these hypotheticals:

If A is non-B it follows that A is non-B;

If non-A is BC it follows that non-A is B;

If a figure with no obtuse angle can be a regular triangle then a figure with no obtuse angle can be regular.

I now turn to negative identities, which derive either from *•the principle of contradiction* or from *•disparities*. Stated generally, the principle of contradiction is:

A proposition is either true or false *·but not both·*.

This contains two assertions: **(1)** that truth and falsity are incompatible in a single proposition, i.e. that a proposition can't be both true and false at once; **(2)** that...it can't happen that a proposition is neither true nor false. Now, all of that holds true for every proposition one can imagine:

What is A can't be non-A,

What is AB can't be non-A,

An equilateral rectangle can't be non-rectangular,

It is true that every man is an animal so it is false that
there is some man who isn't an animal.

We can provide many variations on these assertions and

apply them to hypotheticals, conjunctions, disjunctions, and others. As for •disparities, these are propositions saying that the object of one idea is not the object of another idea; for instance

Warmth is not the same thing as colour,

Man and animal are not the same although every man is an animal.

All these can be established with certainty, without any proof, i.e. without bringing them down to an opposition (i.e. down to the principle of contradiction); •but this happens only when the ideas are well enough understood not to need any analysis at this point. When they are not, one is liable to error: someone who said

The triangle and the trilateral are not the same would be wrong, since if we consider it carefully we find that three sides and three angles •must• always go together. And if he said

The quadrilateral rectangle and the rectangle are not the same

he would be wrong again, since it turns out that only a four-sided figure can have all its angles right angles. However, one can still say in the abstract that

Triangularity is not trilaterality,

or that what it takes to make something a triangle is different from what it takes to make a thing a trilateral. They are different aspects of one and the same thing. [Theophilus then embarks on a three-page discussion of technical aspects of the syllogism, omitted here. Leibniz had evidently written this independently, and hauled it into the *New Essays*, where it doesn't fit well. Then:]

As for the proposition that *Three is equal to two and one*, which you also offer as known intuitively, I have to tell you that this is nothing but the definition of the term *three*. The simplest definitions of numbers are constructed like this:

Two is one and one

Three is two and one

Four is three and one

and so on. It is true that a hidden assertion is involved, namely that these ideas are possible—which in these present cases we know intuitively. Thus definitions can be said to include intuitive knowledge in cases where their possibility is obvious straight off. In this way all adequate definitions contain primary truths of reason, and hence intuitive knowledge. And one last point: all the primary truths of •reason are immediate with the immediateness of •ideas. As for primary truths of •fact, these are inner experiences that are immediate with the immediateness of •feeling. This is where the first truth of the Cartesians and St Augustine belongs:

I think, therefore I am.

That is,

I am a thing that thinks.

But we must realize that just as •identities can be general or particular, and that they are equally evident in either case (since *A is A* is just as evident as *Any thing is what it is*), so it is with the •primary truths of fact. For not only is it immediately evident to me that

I think

but it is just as evident that

I think various thoughts: at one time I think about A and at another about B and so on.

Thus the Cartesian principle is sound, but it isn't the only one of its kind. This shows that all the primary truths of reason and of fact have this in common: we can't prove them by anything more certain—which is what makes them *primary*.

Phil: I'm very glad that you have said more about this topic of intuitive knowledge, which I had merely touched on. Now,

demonstrative knowledge is just a *chain of instances of intuitive knowledge* bearing on all the connections of the intermediate ideas. **2** In many cases the mind can't *immediately* join two ideas A and B, or compare them or apply one to the other; which means that intuitive knowledge linking A with B can't be had. In those cases the mind has to avail itself of one or more intermediate ideas to discover whether A agrees or disagrees with B; and this is what we call 'reasoning'. For instance, in demonstrating that the •three angles of a triangle are equal to •two right angles, one finds other angles that can be seen to be equal both to the •three angles of the triangle and to •two right angles. **3** Those intervening ideas are called 'proofs', and the mind's ability to find them is called 'sagacity'. **4** Even after the intermediate ideas have been found, this kind of knowledge doesn't automatically spring to the mind; it can only be gained through work and concentration. One has to go through a sequence of ideas, one by one; **5** and before the demonstration is completed there is a doubt. **6** Demonstrative knowledge is less clear than intuitive knowledge, just as an image reflected from one mirror to a second to a third. . . grows feebler each time it is reflected, and as it comes off the last mirror in the sequence it isn't at first sight as knowable—especially to weak eyes—as when it comes off the first mirror. That is how it is with knowledge derived from a long sequence of proofs. **7** Although in conducting a demonstration every step that reason makes is intuitively known or directly seen, nevertheless the memory doesn't always exactly retain these connections of ideas in this long sequence of proofs, and men often embrace as 'demonstrations' things that are actually false.

Theo: As well as •natural sagacity and •the sagacity acquired by training, there is an •art of finding intermediate

ideas—and this is the art of *analysis*. In order to carry this discussion further I have to point out that there are two different kinds of question that might require analysis for their answer. **(1)** Sometimes it's a matter of finding the truth or falsity of a given proposition, which is the same as answering a 'whether' question, i.e. whether it is or isn't the case that P. That is tantamount to this:

P is true/false

STRIKE OUT THE ONE THAT DOES NOT APPLY.

(2) And sometimes the question being tackled is more along the lines of 'How does it come to be the case that P?' which is tantamount to

P comes to be the case because— //FILL IN THE BLANK.

Other things being equal, questions of kind **(2)** are more difficult than questions of kind **(1)**. It is only kind **(2)** that the mathematicians call 'problems'. An example would be someone who wants to find a mirror that will bring all the suns rays together at a point, i.e. wants to know its shape or how it is constructed. Such a problem can be expressed in the form:

A mirror that is shaped—will bring the sun's rays etc. //FILL IN THE BLANK, or

By doing—you will make a mirror that brings the sun's rays etc. //FILL IN THE BLANK.

In the case of questions of type **(1)**, where the issue concerns merely the truth or falsity of a given proposition, with nothing having to be added to its subject or its predicate, less exploration and •discovery is involved; but *some* is needed, and •judgment alone isn't enough. A man of good judgment—i.e. one who can exercise care and restraint, and who has the necessary leisure, patience and openness of mind—can indeed *understand* the most difficult demonstration if it is properly presented. But the most judicious man on

earth won't always be able to *find* this demonstration unless he gets help. So discovery is involved here too. Among geometers there used to be more of it than there is now, because when analysis was less developed, more sagacity was needed to carry it out. That's why some geometers of the old school, and others who aren't yet really at home in the new methods, still think they are working wonders when they find the demonstration of some theorem that others have discovered. But those who are versed in the art of discovery know whether or not such a demonstration deserves praise. [He gives a geometrical example for which then-current proof-checking procedures would be adequate, mentions a variant on it that is so 'tangled' that those procedures wouldn't be up to the job; and continues:] It can also happen that induction presents us with numerical and geometrical truths for which we still haven't discovered general reasons. For we are far from having brought geometrical and numerical analysis to completion, as some have been led to think we have by the bragging of some otherwise excellent men who are a bit too hasty or too ambitious. But it is much harder •to *find* important truths, and still more •to find ways of *doing what one wants exactly when one wants it*, than it is •to find demonstrations for truths that someone else has discovered. Fine truths are often reached by 'synthesis', going from the simple to the composite, but when it is a matter of finding exactly the right way of doing what is required synthesis usually isn't sufficient—to try to make all the necessary combinations would often be like drinking the ocean. . . .

Phil: 8 Now, when demonstrating we always presuppose intuitive knowledge, and that, I think, is what has given rise to the axiom that *all reasoning is from things already known and conceded*. But •I shan't go into that now: we'll have occasion to discuss how far that axiom is mistaken when we

discuss maxims, which are wrongly thought to be the basis of all our reasonings.

Theo: I'll be interested to see what you can find wrong in such an apparently reasonable axiom. If we had always to reduce everything to what is intuitively known, demonstrations would often be intolerably wordy; and that's why the mathematicians have adroitly broken up difficult questions and demonstrated intervening propositions separately. There is room for skill and technique in this too: intervening truths. . . .can be given in various ways, and it's helpful to both understanding and memory if we choose ones that greatly shorten the proof and that appear memorable and worth demonstrating for their own sakes. But there's another obstacle, namely that it isn't easy to demonstrate all the axioms, or to break the demonstrations right down into what is intuitively known. And if people had been willing to wait until *that* could be done, we might still have no science of geometry. But we spoke of that in our earliest conversations, and we'll have an opportunity to say more about it later.

Phil: 9. . . .It has been generally taken for granted that the mathematical sciences are the only ones capable of demonstrative certainty, but •this is wrong. Agreeing or disagreeing in ways that can be intuitively known isn't the special privilege of the ideas of number and shape. If mathematicians are the only ones to have achieved demonstrations, that may be because we haven't *worked at* finding demonstrations in other areas. **10** •Why has there been this difference? There have been several causes working together, one being the general usefulness of the mathematical sciences. Another is the fact that in mathematics the least difference is very easy to recognize. **11** There are no exact measures of the different degrees of other simple ideas that are appearances or sensations that have been produced in us, •so that with

them very small differences are hard to recognize. **13** But where the difference is so great as to produce in the mind clearly distinguished ideas such as those of •blue and •red, for example, they are as capable of demonstration as ideas of number and extension.

Theo: There are some rather notable examples of demonstration outside mathematics, and it can be said that Aristotle gave some in his *Prior Analytics*. Indeed, logic admits of demonstration as much as geometry does, and geometers' logic—that is, the methods of argument that Euclid explained and established through his treatment of proportions—can be regarded as an extension or particular application of general logic. Archimedes is the first man whose works we possess who practised the art of demonstration in a context involving physical matters, as he did in his book *On Equilibrium*. What is more, jurists can be credited with some sound demonstrative arguments, particularly the ancient Roman jurists. . . . The sciences of law and warfare are the only ones I know of where the Romans have substantially added to what they had received from the Greeks. . . . It must be acknowledged that in mathematics the Greeks reasoned with the greatest possible accuracy, and that they have provided mankind with perfect examples of the art of demonstration. . . . But it is surprising how far these same Greeks fell away from that standard the moment they moved away, however little, from numbers and shapes in order to do philosophy. . . . It has been easier to reason demonstratively in mathematics largely because experience can vouch for each step in the reasoning. . . . But in metaphysics and ethics there is no longer this parallel between reasoning and experience, and experiments in natural science require labour and expense. Now, the moment men are deprived of that faithful guide, experience, which aids and sustains their

steps like the little wheeled device that keeps toddlers from falling down, they at once allow their attention to waver and as a result they go astray. (There has been an alternative method of keeping them from straying, but it hasn't been and still isn't sufficiently taken into account. I shall speak of it at the proper time.) As for your last point, blue and red can hardly provide material for demonstrations through the ideas we have of them, since these ideas are confused. . . .

Phil: 14 Apart from intuition and demonstration, which are our two kinds of knowledge, everything else is merely faith, or opinion, but not knowledge—at least as far as •general truths are concerned. But there is another perception that the mind has, this time with regard to the •particular existence of finite things external to us; it is *sensitive* knowledge.

Theo: Perhaps opinion, based on likelihood, also deserves to be called 'knowledge'; otherwise nearly all historical knowledge will collapse, and a good deal more. Anyway, call it what you will, the study of the degrees of *probability* would be very valuable; we don't yet have such a study, and this a serious shortcoming in our logic text-books. For when one can't absolutely settle the question of *whether P is the case*, one could still establish *how likely P is on the evidence*, enabling one to form a reasonable opinion about which side—P or not-P—is the more plausible. And when our wisest moralists bring in the question of what is •safest as well as of what is •most probable, and even put safety ahead of probability, they aren't really abandoning the most probable. For here the question of safety is the question of the improbability of an impending evil. Moralists who are lax about this have gone wrong largely because they have had an inadequate and over-narrow notion of probability, which they have confused with Aristotle's 'acceptability': in his *Topics* Aristotle aimed only to conform to the opinions of other people, so that

for him what is 'acceptable' is. . . . whatever is accepted by the greatest number of people or by the most authoritative people. He was wrong to restrict his *Topics* to that; this approach meant that he only concerned himself there with accepted maxims, most of them vague—as though he wanted to reason by means of nothing but old jokes and proverbs! But probability or likelihood is broader than that: it must be drawn from the nature of things; and the opinion of weighty authorities is one of the things that can *contribute to* the likelihood of an opinion, but it doesn't produce the entire likelihood by itself. At the time when Copernicus was almost alone in his opinion that the earth goes around the sun, it was still incomparably more likely than the opinion of all the rest of the human race, namely that the sun goes around the earth. I suspect that establishment of techniques for estimating likelihoods would be more useful than a good proportion of our demonstrative sciences, and I have more than once thought of trying it.

Phil: Sensitive knowledge—i.e. knowledge that establishes the existence of particular things external to us—goes beyond mere probability without getting the whole way up to the level of certainty of intuitive or demonstrative knowledge. Nothing is more certain than that the idea we receive from an external object is in our minds; this is intuitive knowledge. But can we infer from this—inferring it *with certainty*—that there exists something external to us corresponding to that idea? Some people think that this is a live question, because men can have such ideas in their minds when no such external thing exists. But I think that in these cases we are provided with a degree of evidentness that carries us past doubt. Everyone is utterly convinced that the perceptions he has when he looks at the sun by day are very different from the perceptions he has when thinks about the sun at night.

And the idea that is revived by memory is quite different from the idea that actually comes to us through the senses. Someone may say that a dream could do the same thing as the senses do. I reply **(1)** that it doesn't matter much whether I remove this doubt of his: where everything is a mere dream, reasoning is useless and truth and knowledge are nothing. **(2)** I think he will acknowledge that dreaming of being in the fire differs from being actually in the fire. And if he persists in appearing sceptical, I shall tell him that it is enough that we certainly find that pleasure or pain follows on the application of certain objects to us, whether they are real or dreamt; and that this certainty is as great as we need to steer ourselves in relation to our happiness or misery, and that is all that concerns us. So I think we can count three sorts of knowledge—•intuitive, •demonstrative and •sensitive.

Theo: I believe you are right, and I even think that to these three kinds of certainty or certain knowledge you could add •knowledge of likelihood. So there will be two sorts of knowledge, just as there are two sorts of proof: one results in certainty and the other leads only to probability. But let us turn to the sceptics' dispute with the dogmatists regarding the existence of things external to us. [He embarks of some reminiscences of controversies he has been involved in. In one them, he says, he showed his opponent . . .] •that the truth about sensible things consists only in the linking together of phenomena, this linking (for which there must be a reason) being what distinguishes sensible things from dreams; but •that the truth about *our* existence and about the *cause* of phenomena is of a different order, since it establishes the existence of substances. . . . You are right when you say that there is usually a difference between sensations and imaginings, but the sceptics will say that

a difference in degree doesn't create a difference in kind. And anyway, although sensations are ordinarily livelier than imaginings, still we know that sometimes imaginative people are as much impressed by their imaginings as others are by the truth of things, and perhaps more so. So I think that where objects of the senses are concerned the true criterion is the linking together of phenomena, i.e. the connectedness of what happens at different times and places and in the experience of different men—with men themselves being phenomena to one another, and very important ones so far as this present matter is concerned. And •the linking of phenomena that warrants the truths of fact about sensible things external to us is itself verified by means of •truths of reason, just as •optical appearances are explained by •geometry. But it must be admitted—you are right about this—that none of this certainty is of the highest degree. For a dream could be as coherent and prolonged as a man's life—that isn't metaphysically impossible. But it would be as contrary to reason as the fiction of a book resulting by chance from jumbling the printer's type together. Anyway, so long as the •phenomena are linked together it doesn't matter whether we call them 'dreams' or not, because experience

shows that we don't go wrong in the practical steps we take on the basis of •phenomena, as long as we take them in accordance with the truths of reason.

Phil: 15 Moreover, knowledge isn't always clear, even when our ideas are. A man that has as clear ideas of •*the angles of a triangle* and of •*equality to two right angles* as any mathematician in the world may nevertheless have a very dim perception of their agreement.

Theo: Ordinarily, when ideas are thoroughly understood, their agreements and disagreements are apparent. But I admit that some of them are so complex that great care is needed to bring out what is concealed in them, and in those cases agreements and disagreements may remain obscure. Regarding your example, I would point out that one can have the angles of a triangle in one's •imagination without thereby having clear •ideas of them. Imagination can't provide us with an •image common to acute-angled and obtuse-angled triangles—i.e. an image of *triangle* in general—yet the •idea of *triangle* ·in general· is common to them; so this idea doesn't consist in images, and it's not as easy as one might think to understand the angles of a triangle thoroughly.

Chapter iii: The extent of human knowledge

Philaethes: 1 Our knowledge doesn't extend further than our ideas, **2** or further than our perception of their agreement or disagreement. **3** It can't always be •intuitive, because we can't always make an immediate comparison between things, for instance the sizes of two equal but very dissimilar

triangles on the same base. **4** Nor can our knowledge always be •demonstrative, because we can't always find the intervening ideas. **5** Finally, our •sensitive knowledge ·at a given time· concerns only the existence of things actually affecting our senses ·at that time·. **6** So not only are our *ideas* very

limited, but our *knowledge* is even more so. Yet I'm sure that human knowledge could be widened greatly if men would sincerely and free-mindedly devote themselves to improving the means of discovering truth, putting into *that* task all the energy and hard work that they now put into supporting falsehood or making it look good so as to maintain their side in some intellectual, political or religious controversy in which they are engaged. But it may be impossible for us to know everything we might want to know concerning the ideas that we do have. For instance, we shall perhaps never be able to find a circle equal to a square and certainly know whether there is such a thing. [The last eight words follow Locke's French translator. What Locke wrote was '... and certainly know that it is so'.]

Theophilus: There are •confused ideas where we can't expect complete knowledge—for example the ideas of some sensible qualities. But with •distinct ideas there is reason to hope for everything. As for the matter of the square equal to a circle: Archimedes has already shown that there *is* such a thing. [He goes into technical details. Then:] There are those who require that the construction be done with nothing but ruler and compass, but •that isn't interesting, because• there are few geometrical problems in which the construction can be done in that way. So what is needed, rather, is to find the proportion between the square and the circle. [Then further technical details, after which:] What all this shows is that the human mind raises questions that are so strange, especially when infinity is involved, that it isn't surprising that it is hard to get to the bottom of them. Especially since often in these geometrical matters everything depends on having a short formula; and that's something we can't always expect, just as we can't always reduce fractions to least terms or find the divisors of a given number. . . . When one has to

cope with something that is infinitely variable, ascending by degrees, one isn't the master of it as one would like to be; and to do everything that is needed for an attempt to arrive methodically at a short formula or at a rule of progression that makes it unnecessary to go any further—that is too laborious. And since the benefits aren't commensurate with the labour, one leaves it to posterity to succeed in the task: they may meet with success when the additional groundwork and new approaches, which time may bring, have made the task shorter and less burdensome. If the people who occasionally address themselves to these studies were willing to do precisely what is needed for further progress to be made, one could hope for a large advance in a short time. . . .

Phil: A further problem is to know whether or not any purely •material being •thinks. Perhaps we'll never be capable of knowing this, despite the fact that we have the ideas of •matter and of •thinking. The question amounts to this:

Has God **(1)** given to some suitably arranged systems of matter a power to perceive and think, or has he **(2)** joined and fixed to such suitably arranged matter a thinking immaterial substance?

We can't know the answer to this because it is impossible for us to choose between **(1)** and **(2)** merely by contemplating our own ideas, without help from •divine• revelation. So far as our notions •or ideas• go, the thought that God can if he wants to

(1) add to our idea of matter a capacity for thinking is not much further from our conceptual grasp than the thought that God might

(2) add to it another substance with a capacity for thinking.

These two are pretty much on a par for us, because we don't know what thinking *is*, nor do we know what sort

of substances God has chosen to endow with that power—which can't be in *any* created being except through God's benevolent choice.

Theo: There's no doubt that this question is ever so much more important than the preceding one. But I don't agree that it is an example of a question to which we can't know the answer. I would go so far as to say that I wish we could affect souls for their own good, and cure bodies of their ills, as easily as I think we can settle this question! I hope you will at least admit that I can make some progress with the problem, without 'offending against modesty' or 'pronouncing magisterially' as a substitute for having good reasons; for what I say will agree with commonly accepted views; added to which I think that I have brought to the question an uncommon amount of attention. [Those two quoted phrases echo Locke's iii.6, though Philalethes doesn't use them.] For a start, I grant you that when people have only confused ideas of thought and of matter, which is usually all they do have, it's no wonder that they can't see how to resolve such questions. (Similarly, if someone has ideas of the angles of a triangle only in the way in which these ideas are commonly had, he'll never come on the discovery that they are always equal to two right angles.) It should be borne in mind that any portion of matter is nothing but an aggregate or the result of one, and that any real aggregate presupposes simple substances or •real unities: can't be collections of things unless there are things that aren't collections. [Theophilus includes in this sentence a clause specifying that he is talking about matter 'understood as a complete being'; by this he means plain ordinary in-the-world matter, and not the abstract 'prime matter' which is assumed in some theories as being the underlying something-or-other that has this or that form.] The nature of those •real unities is to have *perception* and its consequences, and when you bear that in mind you'll be

transported into another world, so to speak: from having existed entirely amongst the phenomena of the senses, you'll come to occupy the intelligible world of substances. And this knowledge of the inner nature of matter—namely that each portion of matter is, or is a result of, a collection of simple substances that have perception—shows well enough what matter is naturally capable of. And it shows that whenever God endows matter with organs suitable for the •expression of reasoning, it will also be given an immaterial substance that •reasons; this is because of the *harmony* that is yet another consequence of the nature of substances. *There can't be matter without immaterial substances*, i.e. without unities: that should put an end to the question of whether God is free to give or not to give immaterial substances to matter! And if the correspondence or *harmony* that I have just spoken of didn't obtain amongst these substances, God wouldn't be acting according to the natural order. To speak of sheerly 'giving' or 'granting' powers is to return to the bare faculties of the scholastics, i.e. to return to thinking of a substance's faculty or power to do such-and-such as something that the substance just *has*, not arising out of its own nature but merely added on by its maker. This involves imagining faculties as little subsistent *things* that can fly into and out of the soul like pigeons flying into and out of a dovecote! It is unknowingly to turn them into substances. A substance is itself a set of *basic powers*; its derivative powers—its 'faculties' if you like—are merely ways of being, i.e. qualities of the substance. They must be derived from the substance, and cannot be derived from matter considered as wholly mechanical and purely passive. . . . I gather that you agree with me that isn't within the power of a bare machine to give rise to perception, sensation, reason. So these must stem from some other substantial thing. To maintain that God acts in any other way, and gives things

qualities that aren't ways of being or qualities arising from substances, is to resort to miracles. . . .

Phil: These explanations of yours have rather taken me by surprise; and you are getting in ahead of me on a number of things I was going to tell you about the limits of our knowledge. I would have told you •that we aren't in a 'state of vision' (as the theologians call it); that •in many things we have to rest content with faith and probability, especially concerning the immateriality of the soul; that •all the great ends of morality and religion are well enough secured, without philosophical proofs of the soul's immateriality; and that •God, who made us at first begin to exist here as sensing thinking beings and for many years continued us in such a state, obviously *can* and *will* restore us to the same state of sensibility in the after-life, and make us capable of receiving there the retribution he has designed for men according to how they have behaved in this life; and finally that •one can see from this that the question of whether the soul is immaterial is not so vastly important to answer as some people. . . .have tried to make us believe. I had been going to say all that, and still more to the same effect; but now I see what a great difference there is between saying that we are *naturally* sensing, thinking and immortal and saying that we are so *only through a miracle*. I agree that a miracle *will* indeed have to be admitted if the soul is not immaterial; but this belief in miracles, as well as being groundless, won't have a very good effect on many people's minds. Your approach also shows me that we can rationally settle the present question without needing to enjoy a 'state of vision' that would put us in the company of those superior Spirits who can see right into the inward constitution of things. . . .

I had thought it to be out of the reach of our knowledge to **(1)** join sensation to extended matter or to **(2)** give existence

to something that has no extension at all. That's why I had become convinced that those who took sides on this question were adopting an unfair practice that sometimes is used, namely:

When you find something to be inconceivable, throw yourself violently into the contrary hypothesis, even if it is equally unintelligible.

I thought that this arose from the fact that **(1)** some people whose minds are too immersed in matter (so to speak) can't allow existence to anything that isn't material; while **(2)** others, not seeing how thought could be within the natural powers of matter, conclude that even God can't give life and perception to a solid substance except by adding some immaterial substance to it. Whereas now I see that if he did so—adding an immaterial substance to a material thing that wasn't qualitatively suitable for this—it would be by a miracle, and that the union of soul with body. . . .no longer seems incomprehensible in the light of your hypothesis of the pre-established agreement between different substances.

Theo: Indeed, this new hypothesis is perfectly intelligible, since all it attributes to the soul and to bodies are states that we experience in ourselves and in bodies; only it establishes these states as being more regular and connected than they have so far been thought to be. The only 'problem' that remains is a problem only for people who want to •imagine something that can only be •thought, like wanting to see sounds or hear colours! These are the people who deny existence to anything that isn't extended, which commits them to denying existence to God himself. And that commits them to relinquishing causes, and to relinquishing reasons for changes in general and for this or that particular change; because these reasons can't come from extension and from purely passive natures, and can't *all* come from •particular

lower active natures, without the pure and •universal activity of •God•, the supreme substance.

Phil: On the subject of the natural capacities of matter, I still have one objection. As far as we can conceive, all a body can do is to strike and affect other bodies, and all that motion can produce is •more• motion; so when we allow it to produce pleasure or pain, or the idea of a colour or a sound, we have to leave our reason behind, go beyond our own ideas, and attribute it to the good pleasure of •God•, our maker. So what reason shall we find to conclude that perception doesn't occur in matter in the same way? . . .

Theo: . . . I deny that matter can produce pleasure, pain or sensation in us. It is the soul that produces these in itself, *in conformity with*—but not *caused by*—what happens in matter. And among our contemporaries, some able people. . . are starting to declare that they understand occasional causes only in my way. Now, on my view nothing unintelligible happens, though •some things are not intelligible to us because• we can't sort out everything that has a part in our confused perceptions; they are expressions of the details of what happens in bodies, and they even have about them something infinite. As for the 'good pleasure' of our maker, •that phrase suggests that God acts arbitrarily, on the basis of his whims, and that is not so•. He conducts himself in accordance with the natures of things in such a way that he produces and conserves in them only what is suitable to them and can be explained through their natures. Explained in a general way, I mean, for often the details are beyond us—•not beyond us *in principle*, merely too complex for us to get to the bottom of them•. (This is comparable with the task of arranging the grains in a mountain of sand according to their shapes: we don't have the persistence and the power to do that, but apart from the sheer size of the task there is

nothing difficult to understand in it.) If on the other hand
 •such knowledge was inherently beyond us, and if
 •we couldn't even *conceive of* a general explanation for the relations between soul and body, and if
 •God gave things accidental powers that were not rooted in their natures and were therefore out of reach of reason in general,

that would open a back door through which to let back in over-occult qualities that no mind can understand, along with unexplainable 'faculties'—those little goblins, . . . *helpful* goblins that come forward like gods on the stage. . . .to do on demand anything that a philosopher wants of them, without ways or means. But to attribute their origin to 'God's good pleasure'—that seems hardly worthy of him who is the supreme reason, and with whom everything is orderly, everything is connected. If God's power didn't perpetually run parallel to his wisdom, his 'good pleasure' would indeed be neither good nor pleasure!

Phil: **8** Our knowledge of identity and diversity stretches as far as our ideas. **9–10** But we have very poor knowledge—indeed almost none—of how our ideas are *connected* by coexistence in a single subject. **11** This holds especially for secondary qualities such as colours, sounds and tastes, **12** because we don't know how they are connected with primary qualities, i.e. **13** how they depend on size, figure and motion. **15** We know a little more about *incompatibilities* amongst those secondary qualities: for instance, a thing can't have two colours at once; and when one seems to see two colours at once in an opal. . . .they're in different parts of the object. **16** The same holds true for the active and passive powers of bodies. Our inquiries into this matter must depend on experience.

Theo: Ideas of sensible qualities are confused. . . . So if we are to know other than through experience how these ideas are linked, it can only be by resolving them into distinct ideas that *accompany* them, as has been done for instance with the colours of the rainbow and of prisms. This method provides a starting point for analysis, which is very useful in natural science; and I'm sure it will enable the study of medicine eventually to make considerable advances, especially if society takes rather more interest in it than it has done up until now.

Phil: 18 As for our knowledge of relations: this is the largest field of our knowledge, and it is hard to work out how far it can go. Any advances we can make will depend on our sagacity in finding intermediate ideas. Those who don't know algebra can't imagine the wonders of this sort that it can perform; and it's not easy to predict what further improvements and helps for other fields of knowledge the sagacious mind of man may yet discover. At least the ideas of *quantity* aren't the only ones that are capable of demonstration. We could have certainty in other areas of our thought—perhaps the most important ones—if our attempts to find them weren't directly opposed by our vices, our passions and our dominant interests.

Theo: You couldn't be more right in what you have just said. Consider the things that I believe we have established about
 the nature of substances,
 unities and multiplicities,
 identity and diversity,
 the constitution of individuals,
 the impossibility of vacuum and atoms,
 the source of cohesion,
 the law of continuity and the other laws of nature;
 and above all about

the harmony amongst things,
 the immateriality of souls,
 the union of soul with body, and
 the preservation after death of souls and even of animals.

What is more important than all this, if it is true? And I believe that it all has been or can be demonstrated.

Phil: Indeed, your theory appears to hold together extremely well and to be very simple. . . . And its simplicity strikes me as being extremely fruitful. It will be good to make this doctrine more and more widely known. But when I spoke of things that matter most to us what I had in mind was *morality*. I grant that your metaphysics provides wonderful foundations for that; but morality can be firmly enough supported without digging that far down. Although, as I remember you remarking, the foundations of morality may not extend so far if they don't have a natural *•*theology like yours as their base, still we can establish inferences that are important for the ordering of human societies merely by considering *•*the goods of this life. Concerning *just* and *unjust* one can establish results that are as secure as any in mathematics. For example,

Where there is no property there is no injustice
 is as certain a proposition as any that are demonstrated in Euclid; because *•*property is a right to a certain thing, and *•*injustice is the violation of a right. Similarly with

No government allows absolute liberty;
 for *•*government is the establishment of certain laws to which it requires conformity, and *•*absolute liberty is the power of each person to do whatever he pleases.

Theo: The ordinary use of the word 'property' is slightly different from that, for it is taken to mean a person's *exclusive* right to a thing. So even if there were no property

·in that ordinary sense—e.g. because everything was held in common—there could nevertheless be injustice. Also, in your definition of ‘property’ you must take ‘things’ to include *actions* as well; for otherwise, even if there were no rights over ‘things’ (·in a narrow sense, excluding actions·) it would still be unjust to prevent men from acting as they need to. But if we *do* take ‘property’ to include actions, it is impossible for there to be no property. As for the proposition about the incompatibility of government with absolute liberty: it belongs among the ‘corollaries’, i.e. the propositions that have only to be brought to one’s attention for their truth to be recognized. . . .

Phil: 19 The uncertainty of words can be substantially remedied, I find, by the use of diagrams; but this can’t be thus done with moral ideas. Furthermore, moral ideas are more complex than the figures ordinarily considered in mathematics, and that makes it hard for the mind to retain the precise combinations of constituents of moral ideas as perfectly as is needed for long deductions. If in arithmetic the various stages weren’t indicated by marks whose precise meanings are known and which last and remain in view, it would be almost impossible to perform long calculations. 20 In moral discourse definitions provide some remedy ·for this trouble·, provided they are *kept to*. And what methods algebra or something like it may some day suggest to remove the other difficulties—who can tell?

Theo: . . . Geometrical figures appear simpler than moral entities; but they aren’t so, because anything that is continuous involves an infinity, from which selections must be made. For instance, the problem:

Divide a triangle into four equal parts by means of two straight lines at right angles to each other

that looks simple but in fact it is quite hard. It’s not like

that with questions of morality, in cases where they can be settled by reason alone. As for your last point: this isn’t the place to discuss extending the boundaries of the science of demonstration, or to suggest the right means for taking the art of demonstration beyond its age-old limits that until now have almost coincided with those of the realm of mathematics. I hope that if God gives me the needed time I shall one day present some work in which I actually make use of these means and don’t limit myself to the accepted rules.

Phil: If you do carry out that plan and do it properly, you will put infinitely into your debt those who are ‘Philalethes’ as I am, i.e. people who sincerely want to know the truth. Truth is naturally beautiful to minds: there is nothing as deformed and unacceptable to the understanding as a lie. Yet men can’t be expected to work hard on such discoveries when their desire for fame, wealth or power makes them accept the comfortable opinions that are currently in fashion, and then look for arguments either to make those opinions look good or to varnish over and cover their ugliness. While each sect and party crams its doctrines down the throats of everyone it can get into its power, without examining their truth or falsehood, what new light can be hoped for in the moral sciences [= ‘in the branches of knowledge that are concerned with human behaviour’]. . . .

Theo: I’m not without hope that at some quieter time or in some quieter land men will avail themselves of reason more than they have done. For indeed one shouldn’t despair of anything; and I believe that mankind is destined to undergo great changes—for better and for worse, but ultimately more for better than for worse. Suppose that this happens some day:

A great monarch has a long and thoroughly peaceful reign; . . . and being a lover of virtue and truth, and endowed with a firmness and breadth of mind, he resolves to make men happier and less quarrelsome, and to increase their command over nature.

Under those circumstances more would be achieved in ten years than would come about in a hundred—maybe a thousand—if events were left to take their ordinary course. But even without that royal help, if the road to intellectual advancement could just once be opened up, many people would start along it—as the geometers did along theirs—if only for the pleasure of it or as a means to fame. As society becomes more civilized, it will eventually pay more attention to the advancement of medicine than it has done so far. . . . The time will come when there are more good physicians, and correspondingly fewer members of certain other professions for which there will then be less need; so that society will be in a position to give more encouragement to the exploration of nature, and especially to the advancement of medicine; and then that important science will grow visibly, and will very soon reach a level far above where it is now. Indeed, I believe that this aspect of public policy will become almost the chief concern of those who govern, second only to the concern for virtue; and that one of the greatest results of sound morality and sound politics will be our getting an improved medical science. . . .

Phil: 21 With regard to the knowledge of real existence (which is the fourth sort of knowledge [see page 178]), it should be said that we have an intuitive knowledge of our own existence, a demonstrative knowledge of the existence of God, and a sensitive knowledge of other things. We shall discuss this more fully later on.

Theo: You couldn't be more right.

Phil: 22 If we want to discover more about the present state of our minds, it would be a good idea, now that we have spoken of knowledge, to look a little into the *dark side* by considering our ignorance—since we have infinitely more of it than we have of knowledge! Here are the causes of our ignorance.

(1) Shortage of ideas.

(2) Lack of a discoverable connection between ideas that we do have.

(3) Failure to track down and precisely examine our ideas.

23 Concerning (1) the shortage of ideas: our only simple ideas are the ones that come to us from our inner and outer senses; and our senses tell us nothing regarding an infinity of created things in the universe; so with regard to the existence and qualities of *those* things we're like blind men in relation to colours, not being *capable* of knowing them. Don't think that human beings are such elevated creatures that anything *they* can't know probably doesn't exist. Man is probably on the lowest level of all thinking beings.

Theo: I think there may also be some below us—why should we want needlessly to put ourselves down? We may occupy a quite honourable level amongst rational animals, for it could be that the higher Spirits have bodies of a different sort such that the name 'animal' wouldn't be right for them. We can't tell whether, of the great multitude of suns, more are superior to our sun than are inferior to it; and we are well placed within its system, for Earth holds a middle position among the planets, and its distance from the sun appears well chosen for a thoughtful animal who has to inhabit it. Furthermore, we have vastly more reason to congratulate ourselves than to complain of our lot, since for most of our hardships we have only ourselves to blame. It would

be especially wrong to complain of the deficiencies in our knowledge when we make so little use of the knowledge that nature is kind enough to give us.

Phil: 24 However, most of the visible world is hidden from our knowledge by its great distance from us; and apparently the *visible* world is only a small part of this whole immense universe. We are fenced into a little corner of space, i.e. the solar system, yet we don't even know what goes on in the other planets. **25** Such knowledge eludes us for reasons of largeness and of distance; but other bodies are hidden from us by their smallness, and these—the microscopically small parts of bodies—are the ones that it would matter most to us to know about, because of the importance of the structures they form. Knowing those structures would enable us to infer the uses and modes of operation of visible bodies, letting us know why rhubarb purges, hemlock kills, and opium makes one sleep. **26** So I'm inclined to suspect that however far our hard work may push experimental philosophy concerning physical things, scientific knowledge will still be out of our reach. [In that sentence 'philosophy' means what we mean by 'science'; and 'scientific knowledge' there means something like 'knowledge embodied in a highly unified, and rigorously structured, very specific body of doctrine'.]

Theo: I do believe that we'll never advance as far as one might wish; yet it seems to me that good progress *will* eventually be made in explaining various phenomena. That is because the great number of experiments that are within our reach can supply us with more than sufficient data, so that all we lack is the art—the set of rules and techniques—for employing them; and I'm not without hope that the small beginnings of *that* will be extended, now that the infinitesimal calculus has given us the means for creating a partnership between geometry and natural science and

now that dynamics has supplied us with the general laws of nature.

Phil: 27 We are even further from having knowledge of Spirits. We can't form for ourselves any ideas of the various kinds that they fall into; and yet they *are* of many different kinds, for the •world of thinking things is greater and more beautiful than the •world of matter.

Theo: Those worlds are always perfectly parallel so far as efficient causes go, but not final causes. [Efficient causes are what we today would simply call 'causes'; final causes are purposes or intentions.] For to the extent that spirits hold sway within matter, they produce wonderful arrangements in it. We see that in the changes that men have made so as to decorate the earth's surface, like little gods imitating God, the great architect of the universe, although only by using bodies and the laws of bodies. There's no limit to what we may conjecture about that countless multitude of Spirits that surpass ourselves. And as spirits all together—those higher ones and ourselves—form a kind of *state* under God, a state that is perfectly governed, we are a long way from

- understanding the system of this world of thinking things, from
- conceiving of the punishments and rewards that are laid up within it for those who, according to the strictest reason, deserve them; and from
- imagining that which eye hasn't seen nor ear heard and which has never entered into the heart of man.

Yet all of this shows that we *do* have all the distinct *ideas* that are needed for a knowledge of bodies and spirits, but not a sufficiently detailed *knowledge of particular facts*, and that we also lack senses sharp enough to sort out the confused ideas and comprehensive enough to perceive them all.

Phil: 28 With regard to the undiscovered connections between the ideas that we have, I was going to tell you that •mechanical events in bodies have no affinity at all with the •ideas of colours, sounds, smells, and tastes, or of pleasure and pain; and that their connection depends only on the good pleasure and arbitrary will of God. But I remember that you hold that there is a perfect correspondence even though it isn't always a complete resemblance. You recognize, however, that ideas involve too much minute detail for us to be able to disentangle what is concealed in them; but you still hope that we shall come much closer to doing so. So you wouldn't want anyone to follow Locke in saying that it is a waste of time to engage in such an inquiry, for fear that this belief—this 'waste-of-time!' pessimism—might impede the growth of science. I would have spoken to you also of the difficulty we've had until now in explaining the connection between the soul and the body, since one can't conceive that a thought should produce a motion in body or that a motion should produce a thought in the mind. But now that I grasp your theory of the pre-established harmony, that difficulty—which we had despaired of solving—appears to me to have suddenly vanished as though by magic. **30** There remains only the third cause of our ignorance—our failure to track the ideas that we *do* have, or *may* have, and our not working hard to find intermediate ideas ·that would show how the ideas we are studying are related to one another·. That is how one can be ignorant of mathematical truths—not

out of any imperfection of our faculties, or uncertainty in the things themselves. The poor use of words has been the greatest hindrance to our discovering the agreements and disagreements of ideas; and mathematicians have avoided a great part of this trouble by forming their thoughts independently of names, and making a habit of directing their minds to the •ideas themselves rather than to •sounds. . . .

Theo: This third cause of our ignorance is the only one that is blameworthy. And you do see that it includes despair about making any progress. This despondency does great harm; and some able and eminent people have hindered the progress of medicine by their mistaken view that time spent on it is time wasted. When you read the Aristotelian philosophers of bygone days treating of atmospheric phenomena—of the rainbow, for instance—you'll find that they believed that one shouldn't even *think* of clearly explaining this phenomenon. . . . Yet what has since happened has shown everyone that that was wrong. It's true that the misuse of terms has caused *much* of the disarray that occurs in our knowledge—not only in the moral and metaphysical sphere that you call 'the world of thinking things' but also in medicine, where this misuse of terms is increasing more and more. We can't always summon diagrams to our aid, as we can in geometry, but algebra shows that one can make great discoveries without constantly bringing in the actual ideas of things. . . .

Chapter iv: The reality of our knowledge

Philaethes 1 Someone who doesn't grasp the importance of having good ideas and of understanding their agreements and disagreements will think this:

In reasoning so carefully on this topic you're building a castle in the air, and your whole system contains nothing but what is ideal [= 'made of ideas'] and imaginary. In your scheme of things a scatterbrained man with a heated imagination will count as knowing more than most people because he has more ideas—and livelier ones—than they do. The visions of a religious fanatic and the reasonings of a sober man will be equally certain, provided that the fanatic talks in a normal-seeming way. . . .

3 I answer that in attending to ideas we are not neglecting things, because our ideas agree with things. 'What is the criterion for this agreement?' I may be asked. **4** And I answer **(1)** that there is obviously such an agreement in the case of our simple ideas, because our mind *can't* make these of its own accord, so they must be produced by things acting on it. And **(2)** that **5** all our complex ideas, except those of substances, are made by the mind itself merely as patterns that might be *copied*; they aren't intended to be the *copies* of any existing thing, and so they can't lack any conformity to things necessary to real knowledge.

Theophilus: Our certainty would be small, or rather non-existent, if it had no foundation of simple ideas except the one deriving from the senses. Have you forgotten how I showed that ideas are inherently in our mind, and that even our thoughts come to us from our own depths because no other created things can have any immediate influence on

the soul? Also, our certainty regarding universal and eternal truths is grounded in the ideas themselves, independently of the senses, just as pure ideas—ideas of the intellect, such as the ideas of *being*, *one*, *same* etc.—are also independent of the senses. But the ideas of sensible qualities such as colour, flavour etc. (which are really only illusory images) do come to us through the senses, i.e. from our confused perceptions. And the truth about contingent singular things is based on the way sensory phenomena are linked together just as required by truths of the intellect. *That*—the distinction between necessary and contingent—is the distinction that ought to be drawn; whereas the one you draw here between simple ideas and complex ones, and within the latter between ideas of substances and those of accidents, appears to me to have no foundation, since *all* ideas of the intellect are modelled on archetypes in the eternal possibility of things, i.e. they are copies of ideas in God's mind, the mind that is the source of all necessity and possibility. [After two more exchanges in which Theophilus dismisses one Lockean doctrine because it assumes that our ideas 'are of our own making', and another because it doesn't attend to the confusedness of our ideas of secondary qualities, Philaethes expounds at length the view that the classifications we are interested in are *ours*. He mocks the muddled criteria that are used in trying to settle—as a yes-no question with a definite correct answer—the question of whether this or that 'monstrous' newborn is human. Theophilus replies sharply that they have discussed this already, , but he takes it up again. His main point:] If we distinguish man from beast by the faculty of reason, there is no intermediate case: the animal in question must either have it or not have it.

Chapter v: Truth in general

Philaethes: 1 ‘What is truth?’ is a very old question. 2 My friends believe that it is the joining or separating of •signs according to how •the things signified by them agree or disagree one with another. By ‘the joining or separating of signs’ I mean something that is also called ‘proposition’.

Theophilus: ·I have three small objections to these remarks, and one large one·. (1) A phrase such as ‘the wise man’ involves a joining of two terms yet doesn’t make a proposition. (2) Negation isn’t the same as separation; for saying ‘the man’ and then after a pause uttering ‘wise’ ·is separating one expression from the other, but it· isn’t making a denial. (3) What is expressed by a proposition isn’t strictly agreement or disagreement. Agreement obtains between two eggs, disagreement between two enemies! What we are dealing with here is a quite special way of agreeing or disagreeing, and I don’t think that your definition explains it. (4) What is least to my liking in your definition of truth is that it looks for truth among *words*, so that if the same sense is expressed in Latin, German, English and French it won’t be the same truth; and we shall have to say with Hobbes that truth depends on the good pleasure of men! That is a very strange way of speaking. Truth is attributed even to God, and I think you will agree that *he* has no need for signs. This isn’t the first time that I have been surprised by the attitude of these friends of yours who are willing to treat essences, species and truths as *nominal* ·or language-based·.

Phil: Don’t go too fast. They take signs to include ideas; and so truths ·won’t all be nominal; rather they· will be either mental or nominal, depending on the kind of signs.

Theo: If distinctions are to be made among •truths on the

basis of •signs, we shall also have •written truths, which can be divided into •paper truths and •parchment ones, and into •ordinary-ink truths and •printer’s-ink ones! It would be better to assign truth to the relationships amongst the objects of the ideas—·i.e. the items that the ideas are ideas *of*·—by virtue of which one idea is or is not included within another. That doesn’t depend on languages, and is something we have in common with God and the angels. And when God displays a truth to us, we come to possess the truth that is in his understanding, for although his ideas are infinitely more perfect and extensive than ours they still have the same relationships that ours do. So truth should be assigned to these relationships. Then we are free to distinguish •truths, which *don’t* depend on our good pleasure, from •expressions, which we invent as we see fit.

Phil: 4 It is only too true that even in their minds men put words in place of ideas, especially when the ideas are complex and indeterminate. But it is true also, as you have observed, that in such a case the mind contents itself with merely taking note of the truth without yet understanding it, being convinced that it *can* understand it whenever it wants to. 6 Furthermore, the action one performs when affirming or denying is easier •to conceive by attending to what happens in us ·when we affirm or deny· than •to explain in words; so don’t take it amiss that I have spoken of ‘putting together’ and ‘separating’, for lack of something better. 8 You will also acknowledge that propositions, at least, can be called ‘verbal’, and that true propositions are both verbal and real—·i.e. are related both to language and to things·. That’s because 9 falsehood consists in combining names otherwise than as their ideas agree or disagree. At any rate, 10 words are the

great channels for truth. **11** There is also *moral* truth, which is saying things according to what we believe; and finally there is *metaphysical* truth, which is the real existence of things conforming to the ideas we have of them.

Theo: [He impatiently brushes aside both parts of that last sentence. Then:] Let us be content with looking for truth in the correspondence between the •propositions that are

in the mind and the •things they are about. It's true that I have also attributed truth to ideas, by saying that ideas are either true or false [III.xxxiii]; but what I mean by that is the truth of the proposition that *the object of the idea is possible*. And in that sense one could also say that a *thing* is true, i.e. attribute truth to the proposition that affirms the thing's actual or at least possible existence.

Chapter vi: Universal propositions, their truth and certainty

Philaethes: **2** All our knowledge is of •general truths or of •particular truths. The former are the most important, but we can't ever properly *know* them, and it's not often that anyone even *thinks of* a general truth except as conceived and expressed in *words*.

Theophilus: I believe that other marks could also produce the same result—the characters of the Chinese show this. And we could introduce a Universal Symbolism—a very popular one, better than the one the Chinese have—if in place of words we used little diagrams that represented •visible things pictorially and •invisible things by means of the visible ones that go with them, also bringing in certain additional marks suitable for conveying inflections and particles. This would at once enable us to communicate easily with remote peoples; but if we adopted it among ourselves (though without abandoning ordinary writing), the use of this way of writing would be of great service in enriching our imaginations and giving us thoughts that were less blind and less word-dependent than our present ones are. [On 'blind

thoughts' see page 77.] Of course not everyone knows how to draw, so that apart from books printed in this manner, which everyone would soon learn to read, some people would only be able to make use of this system by printing of a sort—by having engravings ready to use for printing the pictures on paper and then adding the marks for the inflections and particles by pen. But in time everyone would learn to draw during childhood, so as to be able to take advantage of this pictorial symbolism; it would literally speak to the eyes, and would be much liked by the populace. In fact peasants already have almanacs that wordlessly tell them much of what they want to know. . . .

Phil: That sort of writing strikes me as so satisfactory and natural that I think your scheme will some day be put into operation; and it promises to contribute greatly to perfecting our minds and making our thoughts more real. . . . **4** Now because we can't be certain of the truth of any general proposition, unless we know the precise bounds of what its terms stand for, we have to know the essence of each

species ·if we are to know for certain any general truths about it·. With •simple ideas and •modes it isn't hard to know the essences ·because the only essence they have is a nominal one·. But with •substances ·the picture is more complex: there are two views about what determines the species of substances, and the knowledge of certain truths is (1) impossible on one of them and (2) possible on the other·. (1) On one view, each species is supposed to be marked off by a *real* essence which is different from the nominal essence, and we don't know what this real essence *is*. So ·on this view· it's very uncertain what the scope is of the general word ·naming the species·, and consequently we can't be certain about any general proposition concerning such substances. (2) The other view supposes that the species of substances are nothing but the sorting of substantial individuals under general names according to whether they agree with the various abstract ideas signified by those names, ·and we can know about this because· it is *we* who *make* those names stand for those ideas. On this view, therefore, we can't be in any doubt, with regard to a proposition that is thoroughly known as it should be, whether it is true or not.

Theo: [He complains about the return of this already-discussed topic, but accepts the opportunity to treat it more fully.] [Three points about the rest of this speech: (1) The wording and some of the ordering of material that appear here in 'basic stories' and their 'continuations' are not Leibniz's; but all the content is his, except for bits marked by ·small dots· in the usual way. (2) A 'lowest species' is a species that doesn't split up into two or more sub-species. (3) In Leibniz's day 'Australia' was the name—originally a Latin word meaning 'southern'—of a great land-mass that had been *conjectured* to exist low down in the southern hemisphere. A few explorers had glimpsed bits of it, but its existence as a continent was regarded as a mere item of theory, though Leibniz on page 90 has said that it is well-grounded

theory. The existence of people living there was even further removed from established fact—hence the phrase 'imaginary Australians'.] There are hundreds of truths that we can be certain of concerning (for example) gold, i.e. the body whose inner essence reveals itself through the greatest weight—or greatest ductility or whatever—known here on earth. For we can say that *the body with the greatest known ductility is also the heaviest of all known bodies*. Of course, it's not impossible that everything that we have so far observed in gold will some day be found to characterize *two* kinds of stuff that can be told apart by means of other qualities; in which case there would be gold₁ and gold₂, whereas until now we have provisionally assumed that there is only the lowest species *gold*. It could also happen that gold₁ was still rare while gold₂ was common, and that we saw fit to restrict the name 'true gold' to the rare species gold₁ so as to set it aside—with the aid of new tests that would distinguish it from gold₂—for use in coinage. If that happens, there will then be no doubt that these two species have different inner essences. Even if the definition of an actually existing substance isn't fully determinate in all respects (as in fact the definition of *man* is not, with respect to outer shape), we can still have an infinity of general propositions about him that follow from the qualities that are recognized in him (in the case of *man* his rationality and so on). . . . I shall illustrate this with some possible cases that are probably fictions·. The first one *is* a fiction, because we are the only rational animals on this globe, but that is all right: such fictions help us to know the nature of •ideas of substances, and of •general truths about them:

Basic story: The imaginary Australians come swarming into Europe, and they turn out to be animals having every property that we have so far observed in men, but having a different origin from us, ·i.e. *not*

being descended from Adam.

·This startling event would create •practical problems·. Probably some way would be found of distinguishing the Australians from us; but if not, and if God had forbidden our race to mingle with theirs, and if Jesus Christ had redeemed only ours ·and not theirs·, then we would have to try to introduce artificial marks to distinguish the races from one another. No doubt there would be an inner difference, but since we couldn't detect it we would have to rely solely on the relational property of birth, and try to associate it with an indelible artificial mark that would provide a non-relational and permanent means of telling our race apart from theirs. ·My main concern here, however, is with the •theoretical implications of our coming to know of the existence of the Australians as I have described them—specifically with what it would imply for the practice and language of classification. As regards that, there are two possibilities, depending on what is added to the basic story·.

Continuation (1): We have been regarding *man* as •a lowest species which is •restricted to the descendants of Adam.

Continuation (2): *Man* has •not been regarded as a lowest species or as •a species confined to rational animals descended from Adam. Rather, the word 'man' has been taken to signify ·the genus of rational animals·, a genus ·potentially· containing a number of species: so far as we have known, only one race has belonged to the genus, but there may actually be others.

In case (1) we haven't had any properties of man that could be affirmed of him in a convertible proposition—something of the form 'All men are F and all F things are men'—unless it was affirmed provisionally—as in saying 'All men are rational animals and ·provisionally· all rational animals are men'. If

man has been understood as restricted to the descendants of Adam, then what makes 'All rational animals are men' provisional is its reliance on man's being the only rational one *among the animals that are known to us*. ·And the (fictional) discovery of the Australians whom I have described would bring that out into the open·. The Australians would be *men* too; ·and the exclusion of 'descended from Adam' from the meaning of 'man' would actually make a difference·. In case (2) there would have been convertible propositions about this genus, and the definition of *man* ·simply as 'rational animal· wouldn't be provisional. ·It would unprovisionally fit the genus *rational animals*, and wouldn't even purport to fit the species *rational animals descended from Adam*·. It is the same with *gold*, ·as I shall show through a further story that may be a fiction·:

Basic story: We come to have two distinguishable sorts of gold—the •scarce one that we already know and an •abundant one, perhaps artificial.

Continuation (1): The name 'gold' is kept for the present species—i.e. for natural, scarce gold—so as to keep it linked to the convenience of gold coinage, which depends on the scarcity of that metal.

Continuation (2): The word 'gold' is meant as the name of a genus for which we don't yet know any subdivision ·into species·—a genus that we now treat as a lowest species (but only provisionally, until a subdivision is found).

In the case (1) the definition of 'gold' that we have known up to now in terms of such intrinsic properties as weight, yellowness etc. will ·turn out to have been· merely provisional, and will have to be supplemented by new marks that will be discovered so as to distinguish scarce gold of the old species from the new ·abundant· artificial gold. In the case of (2) the definition of the genus should be regarded not as provisional

but as permanent. Indeed, without troubling ourselves over the names ‘man’ and ‘gold’, whatever name we give to a genus or a lowest known species, and even if we give them no name at all, what I’ve just said would always be true of the ideas of genera and species, and species will be only provisionally defined—sometimes by the definitions of genera. Still, it will always be permissible and reasonable to take it that there is—whether with the genus or with the species—a real inner essence that is ascribable by a convertible proposition and that ordinarily reveals its presence by external marks. . . .

Phil: 7 The •complex ideas that our names of the species of substances properly stand for are •collections of the ideas of qualities that have been observed to exist together in an unknown substratum that we call ‘substance’; but we can’t know for sure what *other* qualities necessarily coexist with the qualities we have ‘collected’ unless we can discover how they depend on their primary qualities.

Theo: The same thing holds for ideas of accidents, if their nature is a little hard to fathom, as in the case of geometrical shapes. [Theophilus says that he has ‘already’ made this point. He will make it again, on page 212.] For instance, if we wanted to find *the shape of a mirror that would bring all the parallel rays of light together at a point, the focus*, we may find various properties of such a mirror without knowing how to construct it; but we’ll remain unsure about many other possible features of it until we find out how to construct the figure that defines the mirror’s shape. This knowledge of •how to construct it is like a key to further knowledge; it corresponds to the knowledge of •the inner constitution of a substance.

Phil: But if we did know the internal constitution of such a body, we would only find such primary. . . .qualities as might

depend on it—i.e. come to know what sizes, shapes and moving forces depend on it. But we would never know what connection they might have with the secondary or confused qualities, i.e. sensible qualities such as colours, tastes and so on. [Locke wrote ‘secondary’; Leibniz inserted ‘or confused’.]

Theo: So you are again assuming that these sensible qualities, or rather our ideas of them, don’t depend *naturally* on how things are shaped or how they move, but only on the ‘good pleasure’ of God who gives us these ideas. You seem to have forgotten my repeated objections to this view, in which I have tried to convince you [page 44] that

these sensory ideas depend on details in the shapes and motions, and they precisely *express* these details—i.e. the ideas themselves are detailed in a way that exactly mirrors the details of the shapes and motions.—though the mechanical processes that act on our senses are too small and too numerous for us to sort out this detail within the confusion.

But if we *did* come to know the inner constitutions of certain bodies, these sensible qualities could be traced back to their intelligible causes and we would see under what circumstances they were bound to be present; even though we would never be able to recognize their causes in our sensory ideas, which are the confused effects of bodies acting on us. For instance, we now have a complete analysis of green into blue and yellow, and almost all our remaining questions about green concern blue and yellow, the ingredients of green; yet we are quite unable to pick out the ideas of blue and yellow within our sensory idea of green, simply because it is a confused idea. A somewhat similar phenomenon is one I have noticed on visits to clock-makers: the swift rotation of a cog-wheel makes us perceive an artificial transparency, because we can’t pick out the idea of the teeth on the wheel

that actually cause this. The wheel's rotation makes the teeth disappear and an imaginary continuous transparent ring appear in their place; it is made up of successive appearances of teeth and of gaps between them, but going so fast that our imaging powers can't distinguish them. So the teeth are encountered in the •distinct notion of this transparency, but not in the •confused sensory perception of it. It is the latter's nature to be confused and to remain so; for if the confusion ceased (e.g. if the motion slowed down enough to let us to observe teeth and gaps separately) it would no longer be *this* perception, i.e. it would no longer be this image of transparency. Now, there is no need to suppose that God bestows this image on us through his 'good pleasure', and that the motion of the teeth on the wheel and of the gaps between them have nothing to do with it! On the contrary, we grasp that the transparency is only a confused expression of what is occurring in this motion—an expression that consists in the blurring together of successive things into an apparent simultaneity. And so we can readily conclude that the situation will be the same with regard to those other sensory images, like colours and tastes and so on, of which we don't yet have such a perfect analysis. (For the truth is that these ought to be called 'images' rather than 'qualities' or even 'ideas'.) It would be enough for all our purposes if we understood them as well as we do that artificial transparency: we can't know more, and it wouldn't be reasonable to want to, for it is self-contradictory to want these confused images to persist while wanting their components to be sorted out by the imaging faculty itself. That would be like wanting to enjoy being deceived by some charming perspective and wanting to see through the deception at the same time—which would spoil the effect. . . . But men often give themselves problems where none exist, by asking for the impossible and then bemoaning their helplessness and the limits of their insight!

Phil: 8 *All gold is fixed* [= 'no gold can be boiled into a vapour'] is a proposition whose truth we can't be certain of. For if 'gold' stands for a species of things distinguished by a real essence that nature has given it, we don't know which particular substances belong to that species, and so we can't confidently affirm *anything* of gold. And if we take 'gold' to stand for a body endowed with a certain yellow colour, malleable, fusible, and heavier than any other that we know, there is no difficulty about knowing what is gold and what isn't. But the only other qualities that can with certainty be affirmed (or denied) of gold are ones that have a discoverable •logical• connection (or a discoverable inconsistency) with the idea of gold. Now fixedness has no known necessary connection with the colour, weight, or the other simple ideas that I have supposed constitute our complex idea of *gold*, so we can't possibly know for sure that *all gold is fixed*.

Theo: We know almost as certainly that *the heaviest of all bodies known on earth is fixed* as that *the sun will rise tomorrow*. This is because it has been experienced a hundred thousand times. It is a certainty of experience and of fact, even though we don't know *how* fixity is linked with the other qualities that this body has. Besides, we shouldn't *contrast* two things that agree with one another and amount to *the same thing*. When I think of

a body that is at once yellow, fusible and resistant to cupellation,

I am thinking of

a body whose specific essence, though hidden from me within it, gives rise to its being yellow, fusible and resistant to cupellation, and reveals itself, at least confusedly, through those qualities.

I see nothing wrong with this—nothing deserving of such often-repeated hostile accusations. [Cupellation is a procedure for

removing impurities from gold; the gold 'resists' this, i.e. isn't removed by it.]

Phil: All I need for present purposes is that **9** our knowledge that the heaviest of bodies is fixed doesn't rest on the agreement or disagreement of ideas. **10** I don't think that amongst all the secondary qualities of bodies and the powers relating to them we could name *two* that we could know for sure must go together or can't go together (except for •two belonging to the same sense that necessarily exclude one another, so that we can •confidently• say, for instance, that what is •white is not •black).

Theo: I think that some •others• might be found. For example:

Every body that is tangible (i.e. can be sensed by touch) is visible.

Every hard body makes a sound when struck in air.

A string or thread produces a note that is in subduplicate ratio to the weight causing the tension in it.

The fact is that what you are asking for can be attained only in so far as we conceive distinct ideas combined with the confused sensory ones.

Phil: 11 It should never be supposed that a body has all its qualities in itself, independently of other things. A piece of gold separated from the reach and influence of all other

bodies would immediately lose all its yellow colour and weight; and perhaps it would lose its malleableness too, becoming brittle. We know how much the plants and animals depend on earth, air and sun; how can we know that *we* aren't somewhat influenced even by the most distant fixed stars?

Theo: This is a very good point. Even if we did know the structure of various bodies, we still couldn't judge very much about what their effects would be unless we knew the inner natures of the other bodies that touch or penetrate them.

Phil: 13 Yet we can •sometimes• form •reasonable• judgments where we don't have knowledge. For an observant man may penetrate further and, on the basis of probabilities taken from careful observation and of well-arranged hints, often make correct guesses at things that experience hasn't yet revealed to him. But still they are only *guesses*.

Theo: But if experience supports these conclusions in a regular way, don't you think we can arrive in this way at propositions that are certain?—at least as certain as 'The heaviest body we have can't be boiled' and 'The second-heaviest body we have can be boiled'. For it seems to me that we can become rightly certain of propositions that we have learned from experience alone and not by the analysis and connection of ideas. I mean moral or physical certainty, not the necessity that gives metaphysical certainty.

Chapter vii: The propositions that are called ‘maxims’ or ‘axioms’

Philaethes: 1 Propositions of a certain kind are labelled ‘maxims’ and ‘axioms’ and are taken to be principles of science; and because they are self-evident, people are prepared to call them *innate*, though nobody (*as far as I know*) has ever undertaken to show why and on what basis they have the extreme clearness that forces us (as it were) to agree to them. But this is worth looking into, to see whether this great evidentness is something that only these propositions have, and also to examine how far they contribute to our other knowledge. [In this speech by Philaethes, the phrase ‘as far as I know’ was italicized by Leibniz, not by Locke.]

Theophilus: Such an inquiry is very useful and even important, but you shouldn’t imagine that it has been entirely neglected. [He cites several examples of such work, including some of Leibniz’s own. Here is one of his anecdotes about this:] Some people objected to Roberval’s assuming the axiom that ‘If equal magnitudes are •added to equals, the wholes are equal’ in order to prove the axiom ‘If equal magnitudes are •subtracted from equals, the remainders are equal’. The objectors judged the two axioms to be similarly evident, and said that Roberval ought to either assume them both or demonstrate them both. This wasn’t my opinion; I believed that to reduce the number of axioms was *always* something gained. And •addition is unquestionably prior to and simpler than •subtraction, because in addition both terms are dealt with in the same way while in subtraction they are not. . . . Anyway, I have for a long time been publicly and privately urging the importance of demonstrating all the secondary axioms that we ordinarily use, by deriving them from axioms that are primary, i.e. immediate and indemonstrable; they are the ones I have been calling ‘identities’ [e.g. page 180].

Phil: 2 Knowledge is self-evident when the agreement or disagreement of ideas is perceived immediately. 3 But other truths are regarded as no less self-evident though they are *not* regarded as axioms. Let us see whether they are provided by the four sorts of agreement that we discussed a little while ago [page 178], namely •identity, •connection, •relation, and •real existence. 4 As regards •identity and •diversity, we have as many evident propositions as we have distinct ideas. For we can deny one of the other, e.g. in saying ‘A man is not a horse’, ‘Red is not blue’. Also, ‘Whatever exists, exists’ is as evident as ‘A man is a man’.

Theo: That is true, and I have already pointed out [page 181] that it is just as evident to say with reference to one illustrative example that *A is A* as to say in general that *any thing is what it is*. But I have also pointed out [page 181] that it isn’t always safe, with the subjects of two different ideas, to deny one of the other—like someone thinking that a trilateral (i.e. a three-sided thing) isn’t a triangle, on the grounds that trilateralness isn’t triangularity. [He describes with amusement a case where a fine old mathematician went wrong in doing this ‘not safe’ thing, and didn’t retract it when the then-youthful Leibniz protested to him. Then:] I mention him only to indicate how far wrong one can go in denying one idea of another, if the case is one where the ideas need to be explored in depth and this hasn’t been done.

Phil: 5 As for •connection or coexistence: we have very few propositions that are self-evident, though there are some: it appears to be a self-evident proposition that *two bodies can’t be in the same place*.

Theo: Many Christians disagree with you, . . . and you

oughtn't to get agreement from Aristotle either, or from those who follow him in accepting real, literal *condensation*—the reduction of an entire body into a smaller space than it previously occupied. . . . If you take a body to be an impenetrable mass then your statement will be true, since it will be an identity or very close to one; but it won't be conceded by your opponents that that's what a real body *is*. At the least they will say that God *could* make a body differently, so that they will accept this impenetrability not as •absolutely or metaphysically necessary but only as •following from the natural order that God has established among things and that experience has vouched for, though they would have to admit that it is also very reasonable.

Phil: 6 As for the •relations of modes, mathematicians have framed many axioms concerning that single relation, *equality*. For example, there is the one you have just discussed: 'If equals are •subtracted from equals, the remainder will be equal.' But I find it no less evident that *One and one are equal to two* and that *If you take two from the five fingers of one hand and two from the five fingers of the other hand, the remaining numbers of fingers will be equal*.

Theo: That one and one make two isn't strictly speaking a truth, but rather the definition of 'two'; though it partakes of the true and the evident because it is the definition of a possible thing. As for applying Euclid's axiom to the fingers of the hand, I am ready to agree that we can grasp what you say about fingers just as easily as we can see it for As and Bs; but to avoid frequent repetitions of the same thing we indicate it generally, and then we need only make substitutions. Otherwise it would be like dispensing with general rules in favour of calculating with particular numbers, which would mean achieving less than one might. For it is better to resolve this general problem: Find two numbers whose sum is one

given number and whose difference is another given number, than merely to look for two numbers whose sum is 10 and whose difference is 6. If I use a mixture of arithmetic and algebra to solve the second problem the calculation will go like this:

Let $a + b = 10$ and let $a - b = 6$;

then I add the two right sides and the two left sides together, which gives me:

$$a + b + a - b = 10 + 6,$$

and, since $+b$ and $-b$ cancel out, this yields:

$$2a = 16, \text{ or } a = 8.$$

Then by subtracting right side from right side and left from left, and seeing that subtracting $a - b$ is adding $-a + b$, I derive:

$$a + b - a + b = 10 - 6,$$

that is:

$$2b = 4, \text{ or } b = 2.$$

In this way I shall indeed get the numbers a and b that I am looking for, namely 8 and 2; they answer the problem, since their sum is 10 and their difference is 6. But that doesn't give me the general method for any other numbers that one might want or be able to put in place of 10 and 6, although this method is as easy to find as the numbers 8 and 2, simply by putting x and y in place of 10 and 6. For if we proceed just as before, we shall have:

$$a + b + a - b = x + y; \text{ that is } 2a = x + y; \text{ that is}$$

$$a = \frac{1}{2}(x + y),$$

and we shall also have:

$$a + b - a + b = x - y; \text{ that is } 2b = x - y; \text{ that is } b = \frac{1}{2}(x - y).$$

This calculation yields the theorem or general rule that when seeking two numbers whose sum and difference are given, one has only to take the larger sought number to be half the •sum of the given sum and difference, and the smaller sought number to be half the •difference of the given sum

and difference. You might notice that I could have dispensed with letters, by treating numbers like letters: instead of putting $2a = 16$ and $2b = 4$, I could have written $2a = 10 + 6$ and $2b = 10 - 6$; this would have given me $a = \frac{1}{2}(10 + 6)$ and $b = \frac{1}{2}(10 - 6)$. Thus the particular calculation would in itself have contained the general one, through my taking these marks 10 and 6 for general numbers like the letters x and y , so as to get a more general truth or method; and by taking these same symbols 10 and 6 *also* for the numbers that they ordinarily signify, I shall have an example that can be grasped by the senses and that can even serve as a check. . . . I have found it very helpful to use numbers in place of letters in extended calculations, for avoiding mistakes and even for carrying out checks. . . .in mid-calculation without waiting for the final result; which is often possible if one selects the numbers shrewdly so that the assumptions turn out true in the particular case. It is also useful in displaying connections and patterns that the mind couldn't sort out so well by letters alone. I have shown this elsewhere, having found that a good symbolism is one of the greatest aids to the human mind.

Phil: 7 As for •real existence, which I listed as the fourth kind of agreement to be found among ideas, it can't provide us with any axioms, since we don't have demonstrative knowledge of *any* being other than ourselves, with the sole exception of God.

Theo: [In this next speech, 'I am thinking' translates '*Je suis pensant*', which is not standard French. It puts the French for 'I am' alongside the French for 'thinking'; but the idiomatic French way to say that is *Je pense*. Leibniz is *forcing* French to express his view that 'I think' contains as part of its meaning 'I am'. In English no force is needed.] One can always say that the proposition *I exist* is evident in the highest degree, since it can't be proved through any

other—indeed, that it is an immediate truth. To say *I think, therefore I am* isn't really to prove existence from thought, since *to think* and *to be thinking* are one and the same, and to say *I am thinking* is already to say *I am*. Still, there is some reason for you not to include this proposition among the axioms: it is a proposition of fact, founded on immediate experience, not a necessary proposition whose necessity is seen in the immediate agreement of ideas. On the contrary,

only God can see how the two items *I* and *existence* are connected,

that is,

only God can see why I exist.

But if you take the word 'axiom' in a broader sense as covering all immediate or non-provable truths, then the proposition *I am* can be called an 'axiom'. In any case we can be confident that it is a primary truth, and indeed. . . .one of the first known statements—first in the natural order of our knowledge, that is, since it may never have occurred to a man to form this proposition explicitly even though it is innate in him.

Phil: I had always thought that axioms don't have much influence on the other parts of our knowledge. But you have cured me of that error by actually showing me an important use for identities. Still, let me tell you what I *did* have in mind on this point, since your explanations may serve to set others right as well. 8 It is a famous rule among the Schoolmen that all reasonings are from *things already known and agreed to*. This rule seems to take •these maxims to be truths known to the mind before the rest, and •the other parts of our knowledge as truths that depend on the axioms. 9 I thought I had shown (I.i.) that axioms are *not* the first things known, on the grounds that the child knows that *the stick* (*for punishment*) that I

show him isn't the sugar he has tasted long before he knows any axiom you like. But you have distinguished •knowledge of particulars or experience of facts from •the principles of universal and necessary knowledge—and I now agree that with the latter we must avail ourselves of axioms. And you have also distinguished between the accidental and natural orders.

Theo: And I also added that in the natural order the statement that *a thing is what it is* is prior to the statement that *a thing is not something else*. I stress 'the *natural order*' because we aren't concerned here with the •sequence of our discoveries, which differs from one man to another, but with •the connection and natural order of truths, which is always the same. But your putting what the child sees among the 'facts' calls for further consideration. You yourself pointed out not long ago that sense-experience doesn't provide absolutely certain truths, free from all risk of illusion. If I may make up a story that is metaphysically possible, the sugar could change into a stick in some undetectable way, to punish the child when he had been naughty. . . . But you will say that all the same the pain inflicted by the stick will never turn into the pleasure that the sugar provides. I reply that the child will be as late in explicitly forming *that* proposition as he will in noticing the axiom that

one can't truthfully say that *what is, at the same time is not*;

even though he is thoroughly aware of the difference between pleasure and pain, as well as of that between perceiving and not perceiving.

Phil: 10 Yet there are a great many other truths that are as self-evident as these maxims. For instance, that *One and two are equal to three* is as evident a proposition as the axiom that *The whole is equal to all its parts taken together*.

Theo: You appear to have forgotten how I called to your attention more than once that 'One and two is three' is the *definition* of the term 'three', so that saying that one and two is equal to three is just saying that something is equal to itself. As for the axiom that 'The whole is equal to all its parts taken together', Euclid doesn't use precisely that. Furthermore, this axiom needs to be qualified, for it must be added that the parts should not themselves contain parts in common: 7 and 8 are parts of 12, but they add up to more than 12; the upper half of a man and his trunk add up to more than the man, since they have his chest in common. But Euclid does say that *The whole is greater than its part*, and this is true just as it stands. The statement that *the body is greater than the trunk* differs from Euclid's axiom only in that the axiom restricts itself to precisely what needs to be said; but by exemplifying it—giving it a body—we turn something that can be •thought into something that can also be •grasped by the senses. You see, the statement that *this whole is greater than that part of it* is actually the proposition that *a whole is greater than its part*, but with its features coloured in or augmented—just as one who says AB says A. So we shouldn't here be contrasting the axiom with the example, as though they were different truths in respect of how evident they are, but rather regarding the axiom as embodied in the example and as making the example true. It is another matter when the example isn't itself evident, and is affirmed as a *deduction from* the universal proposition and not merely as an *instance of* it; and this can happen with axioms too.

Phil: Locke says: 'I have a question for the men who insist that all knowledge of anything other than •contingent• *facts* depends on general, innate, self-evident principles: *What principle do you need to prove that two and two are four?*'

For he holds that the truth of such propositions is known without any proof. What do you say to this?

Theo: I say that I was ready and waiting for you! *Two and two are four* is not quite an immediate truth. Assume that ‘four’ signifies ‘three and one’. Then we can demonstrate it, and here is how.

Definitions.

- (1) *Two* is one and one.
- (2) *Three* is two and one.
- (3) *Four* is three and one.

Axiom.

If equals be substituted for equals, the equality remains.

Demonstration.

- 2 and 2 is 2 and 1 and 1 (def. 1)
- 2 and 1 and 1 is 3 and 1 (def. 2)
- 3 and 1 is 4 (def 3.)

Therefore (by the Axiom)

2 and 2 is 4—which is what was to be demonstrated.

Instead of saying that 2 and 2 is 2 and 1 and 1, we could say that 2 and 2 is equal to 2 and 1 and 1, and similarly with the others. But we can assume that this has already been done throughout, on the strength of another axiom that maintains that a thing is equal to itself. . . .

Phil: We don’t need to demonstrate such a thoroughly known conclusion, but the demonstration serves to show how truths depend on axioms and definitions. So I can foresee how you will deal with various objections that are brought against the use of axioms. It is objected that there will be a vast multitude of principles. But this comes from including among *principles* the corollaries that follow from the definitions with the help of some axiom: since there are countless definitions or ideas, there will be countless princi-

ples in *this* sense of ‘principles’—even if we accept your view that *indemonstrable* principles are axiomatic identities. . . .

Theo: Furthermore, in view of the differences in *how* evident they are, I disagree with Locke’s view that all these truths—which he calls ‘principles’ and regards as self-evident because they are so close to the first indemonstrable axioms—are entirely independent of each other and can’t support one another or throw light on one another. For we can always derive them from axioms, or from other truths closer than they are to the axioms, as I showed you with the truth that two and two make four. . . .

Phil: 11 Locke agrees that maxims have their use, but he believes that it is rather to •silence the obstinate than to •provide foundations for the sciences. ‘Show me’, he says, ‘any science based on these general axioms that couldn’t be shown to stand as firmly without them.’

Theo: Geometry is certainly one such science. Euclid uses axioms explicitly in his demonstrations, and both he and Archimedes base their demonstrations concerning the magnitudes of curvilinear figures on this axiom: *If two magnitudes are commensurable, and neither is larger than the other, then they are equal. . . .* And in geometry we can’t do without axiomatic identities such as the principle of contradiction, which is the principle of arguments *ad absurdum*—i.e. arguments of the form:

P implies Q-and-not-Q. Therefore not-P.

As for the other axioms that can be demonstrated from these, strictly speaking we can do without them and derive our conclusions immediately from identities and definitions; but if we had always to start again from the beginning, our demonstrations would be so wordy and would involve us in such endless repetition that there would be horrible confusion; whereas by assuming intermediate principles that have

already been demonstrated we can readily push ahead. This assumption of already-known truths is particularly useful with respect to axioms, since they come up so often that geometers are obliged to employ them constantly without citing them. So that it would be a mistake to believe that they are not involved just because they may not always be seen cited in the margin.

Phil: But Locke proposes *theology* as an example to the contrary. It is from •revelation that we have received the knowledge of our holy religion, he says, and if we had lacked •that aid maxims could never have given us the knowledge •of God that we have•. Light comes to us, then, either from things themselves or immediately from God’s unfailing truthfulness.

Theo: That is like saying that since medicine is based on experience, reason has nothing to contribute to it! Christian theology—the true medicine of souls—is founded on revelation, which corresponds to experience [perhaps meaning ‘which doesn’t conflict with experience’]; but to make it into a completed system we have also to bring in natural theology, which is derived from the axioms of eternal reason. You accept that the certainty of revelation is based on God’s truthfulness, but isn’t the very principle that *God is truthful* a maxim drawn from natural theology?

Phil: Locke wants the method of •acquiring knowledge to be distinguished from that of •teaching it, or rather that of •teaching and •communicating it. When colleges were established and sciences had their professors to teach what others had discovered, they often made use of maxims to imprint these sciences on the minds of their scholars, and to convince them of certain particular truths by means of axioms. •So much for •teaching and communicating; but as for •acquiring knowledge•: those who first discovered truths

did so on the basis of particular truths, with no help from general maxims.

Theo: I wish he had offered support for this supposed procedure by giving us some examples of particular truths •that were discovered without help from maxims! But if we look carefully into the matter, we won’t find this procedure employed in the founding of the sciences. If a discoverer finds only a particular truth, he is only a half-discoverer. If Pythagoras had merely noticed that

a triangle whose sides are 3, 4, 5 has the property that the square on its hypotenuse equals those on its sides (i.e. that $9 + 16$ makes 25),

would *this* have made him the discoverer of the great truth, •Pythagoras’s theorem•, that holds for all right-angled triangles and has become a maxim among the geometers? It’s true that an example hit on by chance will often *prompt* an intelligent man to *look* for the general truth involved; but *finding* it is usually a very different matter. In any case, this way of discovering things isn’t the best, nor is it the one most used by those who proceed in an orderly and methodical way—they make use of it only in situations where better methods fall short. . . . Discoverers have been delighted to catch sight of maxims and general truths when they have succeeded in arriving at them, since otherwise their discoveries would have remained quite incomplete. So the only thing we can impute to colleges and professors is having collected and ordered these maxims and other general truths. And would to God it had been done even more, and with greater care and discrimination—the sciences wouldn’t be so fragmentary and chaotic. Another point: I grant that the method used to •teach the sciences is often different from the method by which they have been •found, but that isn’t the point at issue. Sometimes, as I

have already remarked, a chance happening provides the occasion for a discovery. If note had been taken of these occasions and a record of them kept for posterity, these facts would have constituted a useful and very substantial part of the history of the practical arts, but it wouldn't have been suitable for making them systematic; sometimes discoverers have proceeded by rational means, but very circuitously, towards the truth. I think that those who have made major advances in the sciences would have done us a favour if they had candidly undertaken, in their writings, to sketch their various attempts. But to construct a scientific *system* on that principle would be like wanting to retain in a finished house all the scaffolding that the builders had needed for putting it up. *Sound* methods of teaching a science are all of such a kind that the science could reliably have been found by means of them. And if they aren't the empiric's methods, i.e. if the truths are taught through reasons or by proofs derived from ideas, this will always be by means of axioms, theorems, rules, and other such general propositions. . . .

Phil: This is how Locke believes that the need for maxims arose. The Schools made *disputation* the test of men's abilities, and declared as winner the person who held his ground. But maxims had to be established as a means of winning over the obstinate.

Theo: No doubt the philosophy schools would have done better to combine theory with practice, as do the schools of medicine, chemistry and mathematics, and to give the prize—especially in moral philosophy—to the one who *did* best rather than to the one who *spoke* best. Still, in metaphysics and some other subjects discourse itself is a product of skill—and sometimes the only one, the one formal proof of a man's mastery. So in some cases it has been right to judge people's skill by their success in discussion. We even

know that at the start of the Reformation the Protestants challenged their adversaries to conferences and debates, and that sometimes their success in these debates led the people to decide in favour of reform. And we also know how much the art of speaking and of producing and marshalling reasons—what might be called the art of debate—can achieve in councils of state and of war, in law courts, in medical consultations, even in conversations. In these situations we *have to* resort to this procedure and be satisfied with words in place of deeds, simply because what is in question is some future event and we can't wait to learn the truth from what ensues. So the art of debate. . . is very important; but unfortunately it is most disorderly, which is why so often no decision—or a bad decision—is reached. . . . In short, the art of discussion and debate needs to be totally reorganized. . . . The fact is that in these encounters truth is pretty much beside the point, and contradictory theses are maintained at different times from the same rostrum. When Casaubon was shown the hall of the Sorbonne and told 'In this room they have debated for many centuries', he replied 'And what conclusions have they reached?'

Phil: In order to prevent the debate running on into an endless train of syllogisms, and to provide a means of deciding between two equally skilful combatants, certain general propositions ·or 'maxims'·, most of them self-evident, were introduced. Everyone accepted these, so they were looked on as general measures of truth, and treated as principles. . . .beyond which there was no going, and which must be kept to by each side ·in the debate·. And thus these maxims, which came to be called 'principles', couldn't be denied in the course of the dispute and settled the question; and so they were taken—wrongly, in Locke's view—to be the source of all knowledge and the foundations of the sciences.

Theo: If only they *had* used them in this way in their debates! Then they would have decided something, and there would have been nothing to complain about. And what could be better than to reduce the controversy—i.e. the truths in contention—to evident and incontestable truths? Wouldn't this be to establish them demonstratively? And who can doubt that principles that ended debates by establishing the truth would at the same time be sources of knowledge? For as long as one's reasoning is sound, it hardly matters whether it is done quietly in one's study or displayed on a public platform. . . . I'm really astonished to see something so praiseworthy attacked because of who knows what prejudice. Locke's example shows clearly that the cleverest men are liable to prejudice when off their guard. Unfortunately academic debates are conducted quite differently. Instead of •establishing general axioms, everything possible is done to •weaken them by means of vague and poorly thought out distinctions. There are certain philosophical rules—big books crammed with them—that people like to use, but these are quite unreliable and imprecise, and anyway debaters take delight in evading their force by splitting hairs. This is the way not •to settle debates but rather •to make them endless and finally to wear one's opponent down. It is as though he were led into a dark room and subjected to blows from all directions, with no-one being able to judge them. This is an excellent arrangement for respondents who have undertaken to maintain certain theses: Vulcan's shield to make them invulnerable, and Pluto's helmet to make them invisible! They have to be very unskilled or very unlucky to get caught under these conditions! It's true that some rules have exceptions, particularly those that bear on complex situations, as in jurisprudence. . . . But if rules like this, with all their exceptions and sub-exceptions •precisely stated•, were to be brought into academic debates, one would have

to debate pen in hand and keep minutes of what is said on each side. . . . [Philalethes produces more of Locke's railing against 'maxims', saying that 'the Schools' have promoted them as helps to arguments, where things would go better if the disputants merely looked for 'intermediate ideas' to help them establish their conclusions. Theophilus replies that it isn't just the Schools that do this; that all sensible people do it, and there is nothing wrong with it as long as the demand for the underlying reasoning isn't pushed too hard, 'needlessly and inopportunistically'.]

Phil: 12 The use of maxims is also harmful when they are associated with notions that are wrong, loose, or unsteady. For then maxims serve to confirm us in mistakes; and even to prove contradictions. For example, someone who follows Descartes in forming an idea of what he calls 'body' as nothing but *extension* can easily demonstrate that there is no vacuum; i.e. no space that has no body in it, by means of •the maxim that *What is, is*. For he knows his own idea, and knows that it is what it is and not another idea. Since for him 'extension', 'body' and 'space' are three words standing for the same thing, it is for him just as true to say that *space is body* as to say that *body is body*. **13** But someone else for whom 'body' stands for *an extended solid* will be led by a similar argument to conclude that the proposition *Space is not body* on the strength of •the maxim *It is impossible for the same thing to be and not to be at the same time*.

Theo: The *misuse* of maxims oughtn't to bring discredit on *all* use of them: every truth has the drawback that if you combine it with falsehoods you can draw false or even contradictory conclusions. In your example there is hardly any need for those •axiomatic identities that you take to be the source of the error and of the contradiction. You would see this if the arguments of those who infer from

their definitions that *space is body* or that *space is not body*, were laid out formally. [He offers a technical criticism of the argument that Locke attributes to the Cartesian. Then:] Your example strikes me as involving a misuse of ideas rather than of maxims.

Phil: 15 It seems, at least, that whatever use one may make of maxims in verbal propositions, they can't yield us the slightest knowledge of substances that exist outside us.

Theo: I am of an entirely different opinion. For example, the maxim that *nature acts by the shortest way* or at least. . . . *by the most determinate way* is sufficient by itself to explain almost the whole of optics, including the optics of reflection and refraction, i.e. the whole of what goes on outside us in the actions of light. . . .

Phil: 19 I should think, at least, that maxims aren't much use when one has clear and distinct ideas; and others contend that even then maxims are utterly useless, claiming that anyone who in such cases can't discern truth and falsehood without such maxims can't do so with their aid either. . . .

Theo: When the truths are very simple and evident, and are very near to identities or definitions, one hardly needs to make explicit use of maxims in order to derive these truths from them—i.e. from the identities or definitions—for the mind employs the maxims *implicitly*, and reaches its conclusion all at once without any stops along the way. But mathematicians would find it very difficult to get anywhere if they didn't have axioms and theorems that were already known. For in a long deduction it is good to stop from time to time and, as it were, set up a milestone for oneself in the middle of the road; this will also help to mark out the route to others. If that isn't done, these long roads will be

too hard to follow, and may even seem rambling and dark, preventing one from picking out and taking a bearing on anything apart from the place one is in. It is like travelling by sea without a compass, on a dark night when one can't see the sea-bed or the shore or the stars. [He goes on to say, and illustrate at scholarly length, that this salutary use of 'maxims' as route-markers occurs not only in mathematics but also in jurisprudence. 'One of the chief ways of making jurisprudence more manageable, and of surveying its vast ocean as though in a geographical chart, is by tracing a large number of particular decisions back to more general principles' of the sort Locke would call 'maxims'. Then he speaks of the use of 'maxims' in theoretical medicine as desirable but harder to manage than in jurisprudence:] In so far as medicine is empirical it is harder and more risky to form universal propositions in it. Furthermore, there are usually complications in particular illnesses. Illnesses imitate substances, so to speak, in such a way that an illness resembles a plant or animal that requires an account all of its own. That is, illnesses are •modes or •ways of being that fit what we have said about •bodies or •substantial things, a recurrent fever being as hard to understand thoroughly as is gold or mercury. So it is good—universal precepts notwithstanding—to search among the kinds of illnesses for healing methods and remedies that will deal with several symptoms and conjunctions of causes at once, and above all to collect the cures that are warranted by experience. . . . So I believe that it will be best to combine the two methods, and not to complain of repetitions in such a delicate and important matter as medicine is. What medicine doesn't have but needs are books full of particular cases and catalogues of previously observed facts—which is just what jurisprudence has too much of, in my opinion. I believe that a thousandth part of the books of the jurists would be enough, whereas we

wouldn't have too much in medicine if we had a thousand times as many well-documented observations. The point is that jurisprudence, when dealing with matters that aren't explicitly treated by laws or by customs, is entirely grounded in reasons; for that part of it can always be derived by reason from the law of the land or, if not from that, from natural

law. And the laws of each land are finite, and they are determinate or can become so. In medicine, on the other hand, there couldn't be too many observations—those first principles of experience—giving reason more opportunity to decipher things that nature has only half-revealed to us. . . .

Chapter viii: Trifling propositions

Philaethes: . . . **2** It *seems* that these purely identical maxims are merely trifling. . . . And I wouldn't have been satisfied with saying merely that this 'seems' to be so if your surprising example of the use of identities in demonstrating conversion hadn't made me step with care when it comes to being scornful of anything. [The demonstration of conversion occurs in the long treatment of syllogisms, omitted from this version at page 181.] Still, I'll report to you Locke's reason for saying that they are utterly trifling. It is that they can be seen at first blush to contain nothing instructive except sometimes to show a man the absurdity he is guilty of.

Theophilus: Do you count that as nothing? Don't you recognize that to reduce a proposition to absurdity is to demonstrate its contradictory? I quite agree that one won't teach a man anything by telling him that he oughtn't to deny and affirm the same thing at the same time; but one does teach him something when one shows him, by force of inference, that he is doing just that without thinking about it. In my opinion it is hard always to forgo these demonstrations by *reductio ad absurdum*, and to prove

everything by direct demonstrations. This is a fact of which geometers, who are very interested in the question, have had plenty of experience. . . .

Phil: **4** I acknowledge that there are legitimate uses of identities, and I can see that this holds even more clearly for propositions—which appear trifling and often are so—in which *a part* of the complex idea is predicated of the object of that idea, as when one says *Lead is a metal*. The only good that does, in the mind of someone who knows what 'lead' and 'metal' stand for, and knows that 'lead' signifies 'a body that is very heavy, fusible and malleable', is that in saying 'metal' one indicates to him several of the simple ideas all at once instead of going through them one by one. **5–7** The same holds when a *part of* a definition is affirmed of the term defined: as in saying *All gold is fusible* (assuming that 'gold' has been defined as 'a body that is yellow, heavy, fusible and malleable'), or *A triangle has three sides*, or *Man is an animal*. . . .—which define the words but don't teach one anything beyond the definitions. But we *are* taught something by being told that man has a notion of God and

that he is put to sleep by opium, because neither of these is any part of the definition of 'man'.

Theo: In addition to what I have said about completely identical propositions, these semi-identicals will be found also to be useful in their own special way. For example: *A wise man is still a man* lets one know that he isn't infallible, that he is mortal, and so on. Someone in a situation of danger needs a pistol-bullet, he has a mould for making bullets but has no lead to use in it; and a friend says to him 'Remember that the silver you have in your purse is fusible'. This friend won't teach him a quality of the silver, but he will make him think of a use he can make of it, as a source of bullets in this emergency. A good proportion of moral truths and of the finest literary aphorisms are of that nature: quite often they teach one nothing, but they do make one think at the right time about what one knows already. . . . The jurists' rule that says *He who exercises his rights doesn't do wrong to anybody* appears trifling. Yet it has an excellent use in certain cases, where it makes one have the very thought that is needed. For example, if someone built his house up to the greatest height allowed by the statutes and usages, thus depriving a neighbour of part of his view, if the neighbour ventured to complain he would at once be rebuffed with this rule of law. I would add that propositions of fact such as that opium is a narcotic lead us on further than do truths of reason, which can never make us go beyond what is in our distinct ideas. As for the proposition that every man has a notion of God, if 'notion' signifies *idea* then that is a proposition of reason, because in my view the idea of God is innate in all men. But if 'notion' signifies *an idea that involves actual thinking*, then it is a proposition of fact, belonging to the natural history of mankind. One last point: the proposition *A triangle has three sides* isn't as much of

an identity as it seems, for it takes a little attention to see that a polygon must have as many angles as sides; and if the polygon weren't assumed to be closed the sides would outnumber the angles by one.

Phil: 9 It seems that the general propositions that are made about substances, if they are certain, are mostly just trifling. Anyone who knows the meanings of the words 'substance', 'man', 'animal', 'form', 'soul', 'vegetative', 'sensitive', 'rational' can make many propositions that are undoubtedly true but *useless*—especially about the soul, which people often talk about without knowing what it really is. A man may find countless propositions, reasonings and conclusions of this sort in books of metaphysics, School-divinity and some kinds of natural science without knowing any more about God, spirits or bodies than he knew before he had skimmed through those books.

Theo: It's true that the general run of surveys of metaphysics and of other books of that sort teach nothing but words. . . . But to be fair to the deeper Scholastics, . . . it should be acknowledged that *their* works sometimes contain substantial discussions—for instance of

the continuum,
the infinite,
contingency,
the reality of abstract entities,
the principle of individuation,
the origin of forms,
a vacuum among forms [see explanation on page 142],
the soul and its powers,
God's communion with created things,
and so on, and even, in moral philosophy, of
the nature of the will and
the principles of justice.

In short, it must be admitted that there is still gold in that dross. But only enlightened people can profit from it; and to burden the young with a great jumble of useless stuff just because it contains good things here and there is to waste the most precious of all things, namely *time*. I would add that we do have *some* general propositions about substances that are certainly true and also worth knowing: Locke's doctrines include—whether as original to him or partly following others—some great and beautiful truths about God and about the soul; and perhaps I have been able to add something to them. As for knowledge of general truths about bodies: many significant ones have been added to the ones that Aristotle left for us, and it ought to be said that natural science—even the general part of it—is much more real, much more *thing-oriented*, than it used to be. As for real metaphysics, we are on the brink of starting to get it established, and are discovering important general truths, based on reason and confirmed by experience, which hold for substances in general. I hope that I too have contributed a little to what is known of the soul, and of spirits, in general. That is the sort of metaphysics that Aristotle asked for. . . . It was to relate to the other theoretical sciences as the science of happiness does to the practical arts on which it relies, and as the architect does to the builders. That's why Aristotle said that the other sciences depend on metaphysics as the most general science, and should borrow their principles from metaphysics, which is where they are demonstrated. It should also be understood that metaphysics relates to true moral philosophy as theory to practice. That is because justice and virtue have their proper *extent* only because of the doctrine of substances in general, the knowledge about spirits—and especially about God and the soul. . . . If there were no providence and no after-life, the wise man's practice of virtue would be more restricted, since he would

refer everything only to his present satisfaction; and even that satisfaction—which has already been exemplified in such wise men as Socrates, the emperor Marcus Aurelius, Epictetus, and other ancients—wouldn't always be as well grounded as it actually *can* be, in the absence of those broad and beautiful perspectives that are opened up to us by the order and harmony of the universe, extending to an unlimited future. Without those perspectives, the soul's tranquillity would amount merely to resignation, [i.e. to quietly *putting up with* whatever the world dishes out]. So it can be said that natural theology—with its two divisions, theoretical and practical—contains both real metaphysics and the most perfect moral philosophy.

Phil: Those are cases of knowledge that are certainly very far from being trifling or merely verbal. **12** But it seems that purely verbal propositions are ones in which one abstract term is affirmed of another, for example *Parsimony is frugality*, or *Gratitude is justice*. However attractive these and other propositions may sometimes seem at first sight, if we squeeze out their content we shall find that it amounts to nothing but the meanings of words.

Theo: But the principles of *all* demonstrations are expressed by the meanings of words (i.e. definitions) together with axiomatic identities; and since these definitions can show *what* the ideas are and at the same time *that* they are possible, it is evident that not everything that depends on them is purely verbal. Take the example *Gratitude is justice* or rather . . . *a part of justice*: that shouldn't be treated as trivial, for it conveys the knowledge that the . . . accusation that can be brought against someone who is ungrateful should receive more attention in the law courts. The Romans entertained this kind of legal action against freedmen, i.e.

those who had been released from slavery, and even today it ought to be valid in connection with the revocation of gifts. Finally: I have already remarked elsewhere [page 156] that abstract ideas can also be attributed to one another as genus

to species, as when one says that duration is a continuous quantity, or that virtue is a disposition; but universal justice isn't merely a virtue—rather, it is the whole of moral virtue.

Chapter ix: Our knowledge of our existence

Philaethes: 1 So far we have considered only the essences of things; and since our mind knows these only by abstraction, separating them from all particular existence except what is in our understanding, they give us no knowledge of real existence at all. And universal propositions of which we can have certain knowledge don't concern existence. Furthermore, whenever something is attributed to an individual belonging to a given genus or species, by a proposition that wouldn't be certain if it made the same attribution to the genus or species as a whole, the proposition only concerns existence, and only declares an accidental relationship in particular existing things—as when it is said that a certain man is learned.

Theophilus: Yes, indeed! And that is how the matter is viewed by philosophers, too, when in their often-repeated distinction between •essence and •existence they associate with •existence everything that is accidental or contingent. Very often a *universal* proposition that is known only through experience may, for all we know to the contrary, be accidental too, for our experience is limited. For example, in a country where water never freezes they would arrive at the proposition that *water is always in a fluid state*; but this

isn't essential, as is discovered by coming to colder lands. However, we can take 'accidental' in a narrower way, so that there is a kind of middle ground between •the accidental and •the essential: this middle ground is •the natural, meaning something that doesn't necessarily belong to the thing but which nevertheless is inherently appropriate to it if nothing prevents it. Thus someone could maintain that fluidity isn't really essential to water but is at least natural to it. One *could* maintain this, I repeat, but still it hasn't been demonstrated, and inhabitants of the moon might have grounds for thinking they were just as entitled to say that it is natural for water to be frozen. There are other cases, though, where naturalness is less problematic: for example, a light-ray always travels in a straight line while in the same medium unless it happens to meet a surface that reflects it. . . .

Phil: 2 I have already remarked, following Locke, that we know our own existence by intuition, that of God by demonstration, and that of other things by sensation; and I recall that you heartily applauded [page 193]. **3** The intuition that lets each of us know that he exists does so in a wholly evident manner that doesn't admit of proof and doesn't need proof; with the result that even when I undertake to

doubt everything, this very doubt won't allow me to doubt my existence. In short, on this topic we have the highest imaginable degree of certainty.

Theo: I wholly agree with all this. And I add that

- the immediate awareness of our existence and of our thoughts provides us with the first *a posteriori* truths,

or truths of fact, i.e. the first experiences; and

- identical propositions embody the first *a priori* truths or truths of reason, i.e. the first illuminations.

Neither kind admits of proof, and each can be called 'immediate'—the former because •nothing comes between the understanding and its object, the latter because •nothing comes between the subject and the predicate.

Chapter x: Our knowledge of the existence of God

Philaethes: 1 God, having equipped our soul with the faculties that it is endowed with, hasn't left himself with no witness to his existence; for sense, understanding and reason provide us with clear proofs of his existence.

Theophilus: Not only has God endowed the soul with the faculties it needs to know him, but he has also stamped the soul with his trade-mark, so to speak, though faculties are needed if the soul is to be aware of this. But I don't want to revive our earlier discussions of innate ideas and truths, amongst which I count the idea of God and the truth of his existence. Let us instead come to the point.

Phil: Well, although the existence of God is the most obvious truth that reason reveals to us, and though its evidentness (if I'm not mistaken) equals mathematical certainty, it still requires *attention*. All that is needed for a start is to reflect on ourselves and on the unquestionable fact that we exist. 2 Accordingly, I take it that everyone knows that he is something that actually exists, and thus that he is a real being. If there is anyone who can doubt his own existence, I

declare that I am not talking to him! 3 Next, we know by an intuitive certainty that bare •nothing can't produce •any real being. Whence it follows with mathematical evidentness that something has existed from all eternity; since whatever had a beginning must be produced by something else. 4 Now, any being that draws •its existence from something else also draws •everything it has, including all its faculties, from the same source. So this eternal source of all beings is also the origin of all their powers; and so this eternal being must be omnipotent. 5 Next, a man finds that he has knowledge. So there exists some knowing intelligent being. But things that have absolutely no knowledge or perception couldn't possibly produce a knowing being, and it is inconsistent with the idea of *senseless matter* that such matter should put sense into itself. So things have their source in a knowing being, and there has been a knowing being from eternity. 6 An eternal, most powerful, and most knowing being is what is called 'God'. If despite all this I were to come across someone so unreasonable as to suppose that

- only man is and wise, that
- all the rest of the universe acts blindly and haphazardly, and that
- he is the product of mere chance ·events belonging to that blind haphazard·,

I would advise him to study at his leisure Tully's firm and reasonable rebuke: 'What can be more stupidly arrogant than for a man to think that *he* has reason and understanding, but that there is no intelligence that governs this whole vast universe?' From what I have said it is plain that we have a more certain knowledge of the existence of God than of anything else external to us.

Theo: I assure you perfectly sincerely that I'm most distressed to have to find fault with this demonstration; but I do so only so as to get you to fill the gap in it. It is mainly at the place where you infer that 'something has existed from all eternity'. I find an ambiguity there. If it means that

there has never been a time when nothing existed,

then I agree with it, and it really does follow with entirely mathematical rigour from the preceding propositions. For if there had *ever* been nothing, there would *always* have been nothing, because a being can't be produced by nothing; and if nothing had been produced we ourselves wouldn't have existed, which conflicts with the first truth of experience. But you go straight on in a way which shows that when you say that something has existed from all eternity you mean an eternal thing, ·so that your sentence means 'There is a thing that has always existed'·. But from what you have asserted so far it doesn't follow that if there has always been something then one certain thing has always been, i.e. that there is an eternal being. For some opponents will say that I was produced by other things, and these by yet others, ·and so on backwards, so that there were always things

that could produce later things, but nothing lasted through all time·. Furthermore, there are those who admit eternal beings (as the Epicureans do with their atoms) but don't regard themselves as committed to granting that there is an eternal being that is the sole source of all the others. They will agree that whatever confers existence also confers the things' other qualities and powers, but they will deny that *a single thing* gives existence to the others, and will say that for each thing the joint action of several others is required. Thus, we shan't be brought by your argument, unaided, to *one* source of all powers. It is indeed highly reasonable to believe that there is such a source, and that wisdom rules over the universe. But those who believe that •matter can *have* sense won't be inclined to accept that •matter can't possibly *produce* sense; at least, it will be hard to prove this without also showing that matter is entirely incapable of sense. Also, supposing that our thought does come from a thinking being, can we take it for granted, without harming the demonstration, that this being must be God?

Phil: I have no doubt that Locke is capable of making this demonstration flawless; and I shall try to induce him to do so, as there is hardly a greater service that he could render to the world at large. You wish for this too, which leads me to believe that you don't believe that **7** to silence the atheists we should make everything turn on *the existence of the idea of God within us*; like those who are so fond of that darling invention that they reject all other demonstrations of God's existence or at least try to weaken them, and forbid us to listen to them as being weak or fallacious. They say this about the proofs that our own existence and the perceptible parts of the universe so clearly and forcefully present to our thoughts that I don't think any thoughtful person can possibly withstand them.

Theo: Although I support innate ideas, and especially that of God, I don't believe that the Cartesians' demonstrations from the idea of God are complete. I have shown fully elsewhere. . . .that the demonstration that Descartes borrowed from Anselm is truly most elegant and ingenious but that there is still a gap to be filled. . . . The argument runs more or less as follows:

God is the greatest or (as Descartes says) the most perfect of beings; which is to say that he is a being whose greatness or perfection is supreme, containing within himself every degree of it. That is the notion of God. Now here is how existence follows from that notion. Existing is something more than not existing, i.e. existence adds a degree to the greatness or to the perfection—as Descartes put it, existence is itself a perfection. So this degree of greatness and perfection (or rather this perfection) which consists in •existence is *in* that wholly great and wholly perfect supreme being; for otherwise he would be lacking in some degree, which is contrary to his definition. And so it follows that this supreme being exists.

The Scholastics. . . .held this argument in low esteem, regarding it as fallacious; but this was a great mistake on their part, and Descartes, having studied scholastic philosophy for a good while at the Jesuit College of La Flèche, was quite right to revive the argument. It isn't fallacious, but it is an incomplete demonstration that assumes something that should also be proved in order to render the argument mathematically evident. The point is that the argument silently assumes that this idea of a wholly great or wholly perfect being is *possible* and doesn't imply a contradiction. Even without that assumption Descartes's argument enables us to prove something, namely that *If God is possible he exists*—a privilege that no other being possesses! We are

entitled to assume the possibility of any being, and above all of God, until someone proves the contrary; so the foregoing metaphysical argument does yield a demonstrated *moral* conclusion, namely that in the present state of our knowledge *we ought to judge* that God exists and to act accordingly. But it is desirable that able people should fill the demonstration out, so as to achieve strict mathematical evidentness, and I have said something elsewhere that I think may contribute to that end. Descartes's other argument, which undertakes to prove the existence of God on the grounds that

•the idea of him is in our souls and that it must have come from that *of* which it is an idea,

is even less conclusive because it has two defects. **(1)** This argument shares with the preceding one the defect of assuming that there is such an idea in us, i.e. that God is possible. Descartes argues that when we speak of God we know what we are saying and therefore have the relevant idea; but that is a misleading sign; for when we speak of perpetual mechanical motion, for example, we know what we are saying, and yet such motion is an impossibility and so we can only appear to have an idea of it. **(2)** The argument doesn't adequately prove that the idea of God, if we do have it, must come from that of which it is an idea; but I don't want to dwell on that now. You may say: 'Since you acknowledge that the idea of God is innate in us, you oughtn't to entertain doubts about whether there is such an idea!' But I allow such doubts only in the context of what purports to be a rigorous demonstration based wholly on the idea; for we have from other sources enough assurance of the idea and of the existence of God. You will remember, too, that I have shown how ideas are in us—not always so that we are aware of them but always in such a way that we *can* draw them from our own depths and bring them within reach of our awareness. I think it is like that with the idea of God, whose

possibility and existence I hold to have been demonstrated in more than one way—the pre-established harmony itself provides a new and unassailable method. I believe indeed that almost all the methods that have been used to prove the existence of God are sound, and could serve the purpose if they were rendered complete; and I don't *at all* think that we should ignore the proof based on the order of things.

Phil: 8–9 It may be relevant to dwell a little on the question of whether a thinking being can come from a non-thinking being, one devoid of sense and knowledge, such as matter might be. **10** It is pretty obvious that a chunk of matter can't by itself produce anything and can't put itself into motion; so that any motion it has must also be from eternity or else be added to matter by some more powerful being. If this motion were eternal, it could never produce knowledge. Divide matter into parts as tiny as you like—as though to *spiritualize* it—vary the shape and motion of it as much as you please, make of it a globe, cube, cone, prism, cylinder etc. whose diameters are a billionth of an inch. Such a particle of matter, however small it is, will operate on other similar bodies in exactly the way that much bigger bodies act on ones of *their* size. Now, would it be reasonable to think that sense, thought and knowledge could arise from putting large chunks of matter together in a certain array and having them bump into one another? Obviously not! Well, it is just the same with the tiniest chunks of matter there are: they, like the big ones, can't do anything except to bang into one another; so they can't produce knowledge or thought or sensation. But if matter *could* draw sense, perception and knowledge from within itself, doing this *immediately* and without any mechanism, i.e. without the help of shapes and motions—then sense etc. must be a property inseparable from matter and every particle of it. And there's a further

point. Although our general or specific conception of matter makes us speak of it as one thing, yet really all matter is not one individual thing that exists as one material being or one single body that we know or can conceive. So if matter *were* the eternal first thinking being, there wouldn't be

- one eternal infinite cogitative being, but
- infinitely many eternal infinite cogitative beings, independent one of another, of limited force and distinct thoughts;

but those could never produce that order, harmony, and beauty that is to be found in nature. From which it necessarily follows that the first eternal being can't be matter. I hope you will be better satisfied with this reasoning than you were with the preceding demonstration by the same celebrated author.

Theo: This present reasoning strikes me as perfectly sound, and as being not only rigorous but also deep and worthy of its author. I utterly agree with him that material particles, however small they might be, couldn't be shaped and assembled in such a way as to produce perception; seeing that large particles couldn't do so (as is obvious), and that in small particles everything is proportional to what can occur in large ones. Locke makes here another important point about matter when he says that it shouldn't be regarded as one thing, or (in my way of putting it) as a true and perfect monad or unity, because it is only a mass containing infinitely many beings. At this point he was only one step away from my system. For what I do is to attribute perception to all this infinity of beings: each of them is like an animal, endowed with a soul (or some comparable active principle that makes it a true unity), along with whatever it needs in order to be passive and to have an organic body. Now, these beings have received their

active nature and their passive nature, i.e. their immaterial and their material features,

from one universal and supreme cause; for otherwise, as Locke has so well said, their mutual independence would have made it impossible for them ever to have produced this order, this harmony, this beauty that we find in nature. But this argument, which appears to have only moral certainty, is brought to a state of absolute metaphysical necessity by the new kind of harmony that I have introduced, namely the pre-established harmony. Here is how: each of these souls expresses in its own manner what occurs outside itself, and

it can't do this through any influence from other particular beings,

or, to put it a better way,

it has to draw up this expression from the depths of its own nature.

So each soul *must* have received this nature—this inner source of the expressions of what lies outside it—from a universal cause, on which all of these beings depend and which brings it about that each of them perfectly agrees with and corresponds to the others. That *couldn't* occur without infinite knowledge and power. And great ingenuity would be needed, especially, to bring about the spontaneous agreement of the machine with the actions of the rational soul; so great, indeed, that a distinguished writer [Bayle] who offered some objections in his wonderful Dictionary came close to doubting whether all possible wisdom would suffice for the task—for he said that the wisdom of God didn't appear to him to be more than was needed for such a result! He acknowledged, at least, that our feeble conceptions of divine perfection—which are the best we can do—have never been made to stand out so sharply.

Phil: What pleasure I get from this agreement between your thoughts and Locke's! I hope you won't mind if I tell you the rest of his reasoning on this topic. **12** First, he considers whether the thinking being on which all other knowing beings (and therefore all other beings) depend is material or not. **13** He considers the objection that a thinking being could be material. But he replies that even if that were so, it is enough that this should be an eternal being, with infinite knowledge and power. Furthermore, if thinking and matter can be separated, the eternal existence of matter won't follow from the eternal existence of a cogitative being. **14** Those who make God material are further asked whether they believe that every particle of matter thinks. If so, it will follow that there are as many Gods as particles of matter. But if the individual particles of matter don't think, then once more we have a thinking being made up of unthinking parts—which has already been refuted. **15** To say that just one atom of matter thinks and that the other parts, though equally eternal, don't think—this is to say quite arbitrarily that non-eternal thinking beings are produced by one part of matter that is infinitely above the rest. **16** If it is maintained that the eternal and material thinking being is a certain particular mass of matter whose parts are unthinking, we are back with something that has already been refuted; for nothing is achieved by combining the parts of matter—all they acquire is a new set of spatial relations among the parts, which can't possibly give them *knowledge*. **17** It makes no difference whether this mass is immobile or in motion. If it is •not moving it is merely one inactive lump, and so can't do anything that an atom can't do. If it is •moving, this motion that distinguishes it from other parts must be what produces the thought; and so all the thoughts will be accidental and limited, because each part by itself lacks thoughts and has nothing that regulates its movements. There will thus be

neither freedom nor choice nor wisdom, any more than there is in pure blind matter. **18** Some people may believe that matter is at least co-eternal with God. But they don't say why. ·If their point is that it would be too difficult even for God to bring the material universe into existence out of nothing, then I say·: bringing a thinking being into existence (which they do allow) is much more difficult than the production of matter, which is less perfect. 'Indeed,' Locke writes,

'if we freed ourselves from vulgar ideas and raised our thoughts as far as they would reach to a closer contemplation of things, we might be able to aim at some dim and seeming conception of *how matter might at first be made*—brought into existence—by the power of that eternal first being; whereas to bring a spirit into existence would turn out to be a *more* inconceivable effect of omnipotent power. But this ·idea about the creation of matter· might lead us too far from the notions on which the philosophy now in the world is established, in which case it wouldn't be pardonable •to deviate so far from those notions ·as to think in terms of the idea I have referred to·; or •to inquire (as far as grammar would enable us to) whether the common settled opinion really *does* conflict with this ·personal view about how matter might have been created·. This is especially so in this place on the earth where the commonly accepted doctrine serves well enough to for my present purpose, and leaves no room for doubt that once we have supposed the creation of any one SUBSTANCE out of nothing, there is no further difficulty in supposing the creation of all other substances except the CREATOR himself.'

Theo: You have given me real pleasure by recounting something of a profound thought of Locke's, which his over-scrupulous caution has stopped him from offering in its entirety. It would be a great pity if he suppressed it and, after bringing us to a certain point with our mouths watering, left us standing there! I assure you that I think there is something fine and important hidden under this rather enigmatic passage. The word 'substance' in capital letters might make one suspect that he is thinking of the production of •matter along the lines of the production of •accidents ·or qualities·; there isn't thought to be any problem about *their* being derived from nothing. And when he distinguishes his personal thought from the philosophy that is now established in the world or 'in this place on the earth', I suspect that he has the Platonists in mind: they took matter to be something fleeting and transitory, in the way accidents are, and had an entirely different idea of minds and souls. [The phrase 'in this place on earth' follows Leibniz who follows the French translation; but what Locke wrote was only 'in this place', meaning 'in this place in my book'. For an account of what lay behind the 'enigmatic passage', see <http://www.earlymoderntexts.com/jfb/howmat.pdf>.]

Phil: 19 Finally, if anyone were to deny the creation by which things are made out of nothing, on the grounds that they can't conceive it, Locke (writing without knowledge of your discovery concerning the explanation of the soul's union with the body) objects that nor do they understand how •voluntary movements are produced in bodies by •the will of the soul, and yet they still believe that this happens, being convinced of it by experience. . . . And there couldn't be a finer remark than the one he adds at this point: Anyone who limits what God can do to what we can *conceive* of his doing is to make our comprehension infinite or God finite!

Theo: Although in my opinion the difficulty about the union of soul and body has now been removed, other difficulties remain. I have shown *a posteriori* through the pre-established harmony that all monads were created by God and depend

on him; yet we can't understand in detail *how* this was done; and basically the preservation of monads is nothing but a continual creation, as the Scholastics knew very well.

Chapter xi: Our knowledge of the existence of other things

Philaethes: **1** Our own existence is necessarily connected with the existence of God but not of anything else; so our having an •idea of something no more proves •the existence of that thing than a •picture of a man shows •that he exists in the world. **2** However, my sensations make me as •certain of the white and black on this paper as I am of the movement of my hand, and this is surpassed only by my knowledge of my own existence and of God's. **3** This •certainty deserves the name of 'knowledge'. For I don't think that anyone can seriously be so sceptical as to be uncertain of the existence of the things he sees and feels. Anyway, someone who *can* take his doubt that far will never get into an argument with me, because he can't be sure that I say anything contrary to his own opinion! **4** Our perceptions of sensible things are produced by external causes affecting our senses. We don't acquire these perceptions without the •relevant sense• organs, and if the organs alone were enough they would produce these perceptions constantly, •which they don't•. **5** Furthermore, I sometimes find that I •can't avoid having these ideas produced in my mind—for instance *light* when I'm open-eyed in a place where the daylight can enter—whereas I •can lay aside the ideas that are in my memory. So •in the eyes-open case• the lively impression

that I have must come from some exterior cause whose power I can't resist. **6** Some of those perceptions are produced in us with pain yet afterwards are remembered quite comfortably. Though mathematical demonstrations don't depend on the senses, we test them by diagrams, and that involves putting great trust in the evidence of our sight, treating it as being almost as certain as the demonstrations themselves are. **7** Also, our senses in many cases bear witness to each other. If someone has doubts about a fire that he •sees, he can also •feel it; and while I write these words I see that I can change the appearance of the paper; and can tell in advance what new idea it will present to the mind. But once the words have been written I can't choose afterwards to see them other than as they are. Also, the sight of those words will draw the same sounds from another man •as they do from me•. **8** If anyone believes that all this is merely a long dream, I invite him to dream that I give him this answer:

The certainty we get on the basis of our senses is as great as our •make-up is capable of and as great as •our condition needs. Someone who sees a candle burning and experiences the heat of its flame, which harms him if he doesn't withdraw his finger, will have all the certainty he needs to govern his actions. And if

you, dreamer, didn't take your finger out of the flame, you would wake up!

Thus, such assurance is enough for us, being as certain to us as our pleasure or pain, and beyond that we needn't care about the knowledge or existence of things. **9** But beyond our *actual* sensation there is no •knowledge but only •likelihood, as when I believe that *there are ·other· men in the world*; this has a very high probability, but I don't at this moment see any of them because I am now alone in my study. **10** So it would be foolish to •expect demonstration in everything, and to •refuse to act on the basis of very clear and evident truths just because they can't be demonstrated. A man who was willing to conduct himself in that way would be sure of nothing but of perishing quickly.

Theophilus: I have already pointed out during our earlier discussions, that truth about sensible things is established by the links amongst them [page 186]. These links depend on •intellectual truths, grounded in reason, and on •observations of regularities among sensible things themselves, even when the reasons are not apparent. Since these •reasons and •observations provide us with means to make judgments about the future as it bears on our interests, and since the outcome confirms our judgments when they are reasonable, we can't ask for—and indeed we can't *have*—any greater certainty about such objects. Furthermore, we can even explain dreams and how little they are linked with other phenomena. Still, I believe that the terms 'knowledge' and 'certainty' could be extended beyond actual sensations, since clarity and evidentness, which I regard as a kind of certainty, go beyond them, and it would certainly be insane to seriously doubt that there are men in the world when we don't see any. To doubt seriously is to doubt in a *practical* way. We might adopt this:

'certainty' means 'knowledge of a truth such that to doubt it in a practical way would be •insane'.

Sometimes it is taken even more broadly:

'certainty' means 'knowledge of a truth such that to doubt it in a practical way would be •blameworthy'.

(Whereas *evidentness* is shining certainty, where we have no doubt because of how we can see the ideas to be linked together.) On this definition of 'certainty'—i.e. the first of the two given above—we are certain that Constantinople is in the world, and that Constantine, Alexander the Great and Julius Caesar have lived. Of course some peasant from the Ardennes could justifiably doubt this, for lack of information; but a man of letters or of the world couldn't do so unless his mind was unhinged.

Phil: **11** We are reliably assured of many past things by our memory, but we can't certainly judge whether they still exist. I saw water yesterday, and a certain number of very fine colours on the bubbles on that water. I am now certain that the bubbles existed as well as the water, but it is no more certainly known to me that the water exists *now* than it is that the bubbles exist *now*, though the former is infinitely more probable because it has been observed that water lasts while bubbles disappear. **12** Finally, apart from ourselves and God, we know of other Spirits only by revelation, and have only the certainty of faith regarding them.

Theo: I have already pointed out that our memory sometimes deceives us. Whether or not we put our faith in it depends on how vivid it is and how closely linked with things that we know. And even when we are sure of the main point, we can often be in doubt about the details. I remember having known a certain man, because I sense that his image is familiar to me, and his voice too, and this double indication is a better warrant than either one of them alone; but I can't

remember where I have seen him. However, it does happen, though rarely, that we see a person in a dream *before* seeing him in flesh and blood. I have been assured that a lady at a well-known court saw in a dream the man she later married and the room where she became engaged to him, and she described these to her friends, all before she had seen or known either the man or the room. This was attributed to some secret presentiment or other; but events like this don't happen often, so they could be mere matters of chance; and in any case the images in dreams are a little hazy, which gives one more freedom in subsequently connecting them with others.

Phil: 13 We can conclude that there are two sorts of propositions:

- particular ones, concerning existence—e.g. that an elephant exists;
- general ones, concerning the dependence of ideas—e.g. that men ought to obey God.

14 Most of these general certain propositions are called eternal truths, and all of them indeed are so; not because they are eternal propositions actually formed somewhere from all eternity, nor because they are engraved on the mind from any patterns that always existed, but because we can be sure that any properly equipped creature, when he focuses his thoughts on his ideas, will know the truth of these propositions.

Theo: The distinction you draw appears to amount to mine between •propositions of fact and •propositions of reason. Propositions of fact can also become general, in a way; but that is by induction or observation, so that what we really have is only a multitude of similar facts. For example the observation that *all mercury is evaporated by the action of fire*—this doesn't have perfect generality, because we can't

see its necessity. General propositions of reason are necessary, although reason also yields propositions that aren't absolutely general, and are only likely—for instance, when we assume that an idea is possible until a more accurate inquiry reveals that it isn't. Finally there are •mixed propositions that derive from premises some of which come from facts and observations while others are necessary propositions. These include a great many of the findings of geography and astronomy about the sphere of the earth and the paths of the stars, arrived at by combining the observations of travellers and astronomers with the theorems of geometry and arithmetic. But logicians have a principle saying that a conclusion can't be more certain than the least certain of the premises; so these mixed propositions have only the level of certainty and generality that observations •or propositions of fact• have. As for eternal truths: basically they are all conditional. They say, in effect: given so and so, such and such is the case. For instance, when I say: *Any figure that has three sides will also have three angles*, I am saying nothing more than that *Given that there is a figure with three sides, that same figure will have three angles...*

The Scholastics hotly debated the question

How can a proposition about a subject have a real truth if the subject doesn't exist?

The answer is that its truth is a merely conditional one saying that *if* the subject ever *does* exist it will be found to be thus and so. But then the question arises:

What is the basis for this connection?

for it must have a basis, since the conditional proposition contains a reality that doesn't mislead. The reply •to this second question• is that the connection is based on the linking together of ideas. Final question:

Where would these ideas be if there were no mind?
What would *then* become of the real foundation of this

certainty of eternal truths?

This question brings us at last to the ultimate foundation of truth, namely to ·God·, the supreme and universal mind who can't fail to exist and whose understanding is indeed the domain of eternal truths. . . . If you are tempted to think that there's no need to bring God's mind into the story, bear in mind that these necessary truths contain the determining reason and regulating principle of existent things—the laws of the universe, in short. Thus, these necessary truths are

underpinnings of the existence of •contingent beings ·and therefore can't be in any way *based on* such beings·; so they must be based on the existence of a •necessary substance. That is where I find the pattern for the ideas and truths that are engraved in our souls. They are engraved there not in the form of propositions, but rather as sources which, by being employed in particular circumstances, will give rise to actual assertions.

Chapter xii: Ways of increasing our knowledge

Philaethes: We have discussed the kinds of knowledge we possess. Let us turn now to the ways of increasing knowledge, i.e. of finding out the truth. **1** It is the commonly accepted opinion among men of letters that *maxims* are the foundations of all knowledge, and that every science is built on certain *praecognita* [= 'things already known']. **2** Admittedly the great success of mathematics seems to favour this method, and ·in our discussions· you have relied a good deal on that fact. **3** But there is still a question as to whether it isn't the •connection of ideas that has served this purpose rather than •two or three general maxims laid down at the start. A young lad knows that *his body is bigger than his little finger*, but he doesn't know it by virtue of the axiom *The whole is bigger than a part*. Knowledge began with particular propositions, but then there was a desire to use general notions so as to relieve the memory from its bulky load of particular ideas. If the language were so imperfect that it didn't include the relative terms 'whole' and 'part', couldn't

one still know that the body is larger than the finger? That is how Locke argues, but from what you have already said I think I foresee how you will be able to reply.

Theophilus: I don't know why he dislikes maxims so much that he has to attack them all over again. If they serve to relieve the memory of a load of particular ideas, as he acknowledges, they must be *very* useful even if they are good for nothing else! But let me add that that's *not* what gives rise to them, since we don't discover them by induction from instances. Someone who knows that

ten is more than nine, that
his body is larger than his finger, and that
the house is too large to be able to escape through the
door,

knows each of these particular propositions by means of a single general principle. The principle is embodied in and coloured by them, as it were—like a picture which does its

work just by the lay-out of the lines but which is further decorated by having the lines in colour. Now, this single principle is the axiom *The whole is bigger than a part*, which is known implicitly, so to speak, though not at first standing out on its own in that general form. The instances derive their truth from the embodied axiom; the axiom isn't based on the instances. And since this axiom that is common to these particular truths is in the minds of all men, you can readily see that someone can be shot through with it—drenched in it—without having the words 'whole' and 'part' in his vocabulary.

Phil: 4 But isn't it dangerous to give authority to •assumptions disguised as •axioms? One person will follow some of the ancients in assuming that

Nothing exists but matter;

another will agree with Polemo that

The world is God;

and a third will lay it down as a fact that

The sun is the chief god.

Think what a religion we would have if *that* were permitted! Nothing can be so dangerous as principles taken on board without questioning, especially if they concern morality. . . .

So 5 principles must be *certain*. 6 But this certainty comes only from the the inter-relating of ideas; so we don't need any other principles—by following this one rule of attending to (dis)agreements between our ideas we'll get further than by putting our minds at the disposal of others.

Theo: I am surprised that you bring against maxims, i.e. against *evident* principles, the accusation that could and should be brought against principles that are *arbitrarily assumed*. When we ask for *praecognita* in the sciences, i.e. for antecedent knowledge to serve as the foundation for a science, we are asking for *known* principles, not for arbi-

trary assumptions of propositions whose truth is unknown. Aristotle himself understood that the subordinate sciences borrow their principles from other higher sciences within which these principles have been demonstrated. The only exception is the first or highest of the sciences, which we call 'metaphysics': according to Aristotle, metaphysics asks for nothing from the other sciences, and provides them with the principles they need. And when he says that 'the apprentice ought to believe his master' he means that he should do so only for the time being, until he has been instructed in the higher sciences—so that the belief he is recommending is only provisional. This is very far from being receptive to arbitrary principles. I should add that even principles that aren't completely certain can have their uses, if we build on them purely demonstratively. Although all our conclusions from them would then be merely conditional, and would be worth having only if the principle in question were true, nevertheless the very fact •that this connection holds would have been demonstrated, as would •those conditional assertions. That is, even if P is false, deductively deriving Q from it shows •that P and Q are connected in that way, and shows •that *If P then Q* is true. So it would be a fine thing if many books were written in this way: the reader or student, having been warned about the condition to which the book is subject, would be in no danger of error. And behaviour would be governed by these conclusions only to the extent that the initial assumption was independently verified. This same method has another use, namely to verify assumptions or hypotheses, in cases where many conclusions flow from them that are known on other grounds to be true; sometimes the process can work perfectly in reverse, yielding a demonstration of the truth of the hypothesis. . . . Conring reproved Pappus for saying that

analysis undertakes to discover the unknown by assuming it and then proceeding to infer known truths from it.

This, he said, is contrary to logic, which teaches that truths can be inferred from falsehoods, so that P isn't shown to be true by a demonstration of Q—which is known to be true—from it. But I showed him that analysis makes use of definitions and other reciprocal or if-and-only-if propositions, which provide a way of reversing the process and running a demonstration in the other direction. And even when this reverse process is not demonstrative—in natural science, for instance—it still sometimes yields great likelihood, when the hypothesis easily explains many phenomena that would be otherwise puzzling and are quite independent of one another. That is, if Q, R, S and T report four phenomena that puzzle us and seem to have nothing to do with one another, a demonstration that hypothesis P entails *each* of those four makes P highly probable. I maintain that all principles are governed by the super-principle *Make good use of ideas and of experiments*; but if we dig down into this we'll find that so far as ideas are concerned this 'good use' is just the connecting of definitions by means of axiomatic identities. Still, it isn't always easy to attain to such an ultimate analysis [= 'a solid demonstration depending on nothing but definitions and identities'], and geometers haven't yet been able to do this, much as they (or at least the ancient ones) have evidently wanted to. (If Locke were to complete this undertaking, which is a little harder than it is thought to be, he would make them very happy!) Euclid, for instance, includes in his axioms what amounts to the statement that *two straight lines can meet only once*. We can't on the basis of our sense-experience *imagine* two straight lines meeting more than once, but *that* is not the right foundation for a

science. Anyone who thinks that his imagination presents him with connections between distinct ideas can't be properly informed about the source of truths, and would count as immediate—i.e. as basic, rock-bottom, not needing or admitting of proof from anything more basic—many propositions that really are demonstrable from prior ones. This matter hasn't been properly thought out by many people who have found fault with Euclid: *images* of this sort are merely *confused ideas*; someone who knows about straight lines only from his images won't be able to demonstrate anything about straight lines. Euclid had no distinctly expressed idea of a *straight line*, i.e. no definition of it (for the one he offers provisionally is unclear, and useless to him in his demonstrations), so he had to resort to two axioms that served him in place of a definition and that he uses in his demonstrations:

Two straight lines don't have any parts in common.

Two straight lines don't enclose a space.

Archimedes gave a sort of definition of *straight line* when he said that it is *the shortest line between two points*. But in his demonstrations, using Euclid-type elements based on the above two axioms, he tacitly *assumes* that the properties spoken of in those axioms are possessed by the line that he has defined. So if you and your friends appeal to the 'agreement and disagreement of ideas' to justify your belief that it was and still is permissible to admit into geometry what images tell us, without looking for the rigorous demonstration from definitions and axioms that the ancient geometers insisted in this science. . . . then I must tell you that this may be good enough for those who only want rough-and-ready practical geometry but it won't do for those who want a science of geometry—a science by which even the practical kind of geometry is improved. If the ancients had taken that view, and had been lax about this matter, I believe they

would have made hardly any progress and would have left us only an empiric geometry such as the Egyptians apparently had and the Chinese seem to have still. This would have deprived us of the most beautiful discoveries of •natural science and •mechanics, which •geometry has enabled us to make, and which are unknown wherever our geometry is unknown. It is likely, too, that by allowing our senses and their images to guide us we would •not only cut ourselves off from scientific truths but also• be led into errors. We see an example of that in the fact that people who haven't been taught strict geometry believe, on the authority of what they can imagine, that it is beyond doubt that *two lines that continually approach each other must eventually meet*. Whereas geometers offer as counter-examples to that certain lines that they call asymptotes. But apart from that, we would be deprived of what I value most in geometry—considered as a purely theoretical study—namely its letting us glimpse the true source of •eternal truths and of •how we can come to grasp their necessity—which is something that the confused ideas of sensory images can never make clear to us. You will object that Euclid still had to settle for certain axioms whose evidentness can be seen only confusedly, by means of images. So indeed he did; but it was better to •content himself with a small number of truths of that nature, which appeared to him the simplest, and to deduce from them the other truths that someone less rigorous would have taken as certain without demonstration, than to •leave a great deal undemonstrated and—worse still—to leave people free to relax their rigour as the mood takes them. So you see that what you and your friends have said about the 'connection of ideas' as the genuine source of truths needs to be clarified. If you are willing to be satisfied with seeing such connections confusedly, you'll weaken the rigour of demonstrations; Euclid did incomparably better by reducing

everything to definitions and a small number of axioms. But if you want this connection of ideas to be exhibited and expressed distinctly, you will have to avail yourselves of definitions and axiomatic identities, as I require. . . .

Phil: I am beginning to understand what a distinctly known connection of ideas is, and I plainly see that in this case axioms are required. **7** I also see plainly why the method we follow in our inquiries into ideas must be modelled on that of the mathematicians, who from very plain and easy beginnings—which are nothing other than axioms and definitions—by •gentle degrees and •a continued chain of reasonings proceed to the discovery and demonstration of truths that appear at first sight to be beyond human capacity. The techniques for finding proofs—the admirable methods men have discovered for singling out intermediate ideas and ordering them properly—*those* are what have produced such wonderful and unexpected discoveries. Will something like this ever be discovered for ideas other than those of magnitude? I shan't go into this here, except to say: if other ideas were pursued in the way familiar to mathematicians, they would carry our thoughts further than possibly we are apt to imagine. **8** And that *could* be done in morality in particular, as I have several times said.

Theo: I believe that you are right, and I have long been inclined to set about fulfilling your predictions. [In the next two speeches 'science' is used strictly in the 17th century sense = 'knowledge embodied in a highly unified, rigorously structured, and very specific body of doctrine'.]

Phil: **9** With regard to the knowledge of bodies, we have to proceed quite differently, because our lack of ideas of their real essences sends us to experience. **10** I don't deny that someone who is given to rational and regular experiments will be able to make better guesses—better than the rest

of us can make—at the still unknown properties of bodies, but still this is only •judgment and •opinion, not •knowledge and •certainty. This makes me suspect that we can't ever turn natural philosophy into a science. Still, we do have experiments and reports on experience, and from these we can learn things that benefit our health and make our lives easier.

Theo: I agree that the •whole of natural philosophy will never be perfectly a science for us; but still we shall be able to have •some science of nature, and indeed we have some samples of it already. For instance, magnetology can be regarded as such a science: from a few assumptions grounded in experience we can demonstrate by rigorous inference a large number of phenomena that do in fact occur in the way we see to be implied by reason. We can't hope to account for every experiment; even the geometers have still not proved all their axioms. But just as they have been satisfied with deducing a great number of theorems from a small number of rational principles, similarly it will be enough if practitioners of natural science [now using 'science' in our looser sense] can, by means of certain principles of experience, account for a great many phenomena and even predict them in practice.

Phil: 11 We aren't equipped to penetrate into the internal fabric of bodies, so we should consider it enough that our faculties reveal to us •the existence of God and •the knowledge of ourselves, sufficiently to lead us to a full and clear discovery of our duty and of •other things that concern us, especially ones that bear on •our chances of being in heaven for •eternity. And I think I can conclude that •morality is the proper study—and the real business—of •mankind in general, while •the different arts that deal with different parts of nature are to be dealt with by •particular men. For instance, ignorance of the use of iron may well be the reason

why America, which is rich in natural resources, lacks most of the conveniences of life. 12 Far from undervaluing the study of nature, then, I hold that this study, when rightly done, can bring greater benefit to mankind than everything that has been done up to now.

- He who first invented printing did more for the spread of knowledge,

- he who discovered the use of the compass did more for the supply and increase of useful commodities, and

- he who made public the powers of quinine saved more people from the grave,

than the founders of colleges and hospitals and other monuments of showy charity that have been so expensively created.

Theo: You couldn't have said anything more to my liking. True morality or piety. . . ought to stimulate us to cultivate the practical arts. And as I said not long ago [page 193], better policies could provide us some day with far better medical knowledge than we have now. That can't be urged strongly enough—it is second only to the concern for virtue.

Phil: 13 Although I recommend experimentation, I don't lack respect for probable hypotheses; they can lead us to new discoveries and are at least great helps to the memory. But our mind is very apt to go too fast, and to be content with flimsy conjectures rather than taking the time and trouble needed to test them against a multitude of phenomena.

Theo: The art of discovering •the causes of phenomena, or •genuine hypotheses, is like that of deciphering: an inspired guess often provides a generous short-cut. Bacon started putting the art of experimenting into the form of rules, and Boyle was a gifted practitioner of it. But unless we add to that the techniques for using experiments and of

drawing conclusions from them, we can spend a fortune on experiments and still achieve less than an acute thinker could discover in a moment. . . .

Phil: **14** Once we have established clear and distinct ideas with settled names, the great way to enlarge our knowledge is through skill in finding the intermediate ideas that can show us the agreement or conflict between the ideas whose inter-relation we are investigating. **15** Maxims won't help. A man who doesn't have an exact idea of a right angle will fail in his struggles to demonstrate something about

a right-angled triangle. Whatever maxims he employs, he'll have trouble proving with their help that the squares on the sides containing the right angle are equal to the square on the hypotenuse. He may pore on those axioms for as long as he likes without ever seeing more clearly into mathematical truths. . . .

Theo: It is useless to 'pore on axioms' unless you have something to apply them to. Axioms often serve to connect ideas. [He goes on to give a very technical mathematical example.]

Chapter xiii: Some further considerations concerning our knowledge

Philaethes: **1** Perhaps I should add that *knowing* resembles *seeing* in several respects, including this: that each of them is neither wholly necessary nor wholly voluntary. A man with his eyes open in the light can't help seeing (·necessary·) but he can turn his eyes in different directions ·thus making a difference to *what* he sees (voluntary·). **2** And he can ·choose to· look more or less intently at the objects he sees. ·And it's like that with *knowing*·. Thus, as long as the faculty ·of knowledge· is employed, we can't voluntarily choose what to

know, any more than a man can prevent himself from seeing what he does see. **3** But one must ·choose to· employ one's faculties in the right way to be informed.

Theophilus: We discussed this point earlier, and established that a man isn't responsible for having this or that opinion at the present time, but that he is responsible for taking steps to have it or not have it later on [page 78]. So that opinions are voluntary only in an indirect way.

Chapter xiv: Judgment

Philaethes: **1** A man would nearly always find himself *stuck* if he had nothing to guide him except certain knowledge. **2** He must often settle for the twilight of probability. **3** The faculty by which we avail ourselves of probability is *judgment*. Often we settle for judgment because we have no alternative, but often we do it because we are lazy or clumsy or in a rush. It is called 'assent' or 'dissent' . . .

Theophilus: There are people for whom *judging* is what we do whenever we pronounce in accordance with some *knowledge* of the case; and some of them may even distinguish 'judgment' from 'opinion' on the basis that opinions can be more uncertain than judgments can. But I don't want to join issue with anyone over the use of words; and it's all right for you to take a 'judgment' to be a probable belief. . . .

Chapter xv: Probability

Philaethes: **1** If demonstration exhibits the connection of ideas, probability is simply the *appearance of* such connections, resting on proofs [here = 'lines of thought'] in which no logical connection is seen. **2** There are many levels of assent, from •assurance all the way down to •conjecture, •doubt and •distrust. **3** When a conclusion is certain, each step in the reasoning through which it is reached involves intuition. But what makes me believe is something extraneous. **4** And probability is based either on •conformity with something we know or on •the testimony of those who know it.

Theophilus: I would rather maintain that it is always based on •likelihood or on •conformity to truth. The testimony of other people is something else that the truth customarily has on its side when it concerns facts that are within reach. So we can say that the resemblance between the probable and the true comes either from the thing itself or from 'something extraneous'

Phil: **5** If something is remote from everything we know, it doesn't *resemble the truth* 'so far as we know the truth', and so we don't find it easy to believe. . . . **6** But if the *testimony* of others can make a fact probable, the *opinion* of others

shouldn't count by itself as a legitimate basis for probability, since there is more error than knowledge amongst men. If the beliefs of people whom we know and think well of were a legitimate ground of assent, men would have reason to be heathens in Japan, Moslems in Turkey, Papists in Spain, Calvinists in Holland, and Lutherans in Sweden.

Theo: Men's testimony doubtless carries more weight than their opinions do, and we give it greater consideration in the courts. However, we know that judges sometimes require a witness to take an 'oath of credulity', as it is called; during an examination witnesses are often asked not only what they •saw but what they •judge and at the same time •the reasons for their judgment; and what they say is duly taken into account. Also, judges show great deference to the views and opinions of experts in every field; private individuals are no less obliged to do the same in matters that they can't investigate for themselves. So a child (or an inexperienced adult, whose position in this respect is hardly better than a child's) is obliged. . . .to follow the religion of his country so long as he sees nothing wrong with it and isn't in a position to inquire into whether there is a better one.

Chapter xvi: The degrees of assent

Philaethes: **1** Our judgments about what is probable are based purely on what degree of likelihood we •find in the relevant considerations. Or •*did* find when we looked into them: for it must be admitted that my assent ·at a particular time· can't be always from what I see ·at that time of the reasons that have prevailed on my mind. It would be very hard, even for people with admirable memories, always to retain all the lines of thought that made them embrace that side of the question—lines of thought that are in some cases enough to fill a volume on one single question. All that is needed ·to entitle them to assent *now* is that they *did once* carefully and fairly sift the matter and come to a conclusion. **2** Otherwise men would have either to •be outright sceptics or else to •change their opinions every moment, giving in to whomever has recently studied the question and offers them arguments that they can't completely rebut right away—because they haven't time or haven't the memory resources for that. **3** It must be admitted that this often makes men obstinate in error. But the source of the trouble is not •their reliance on their memories but rather •their judging badly in the first place. For often the reflection 'I never thought otherwise' serves a man as a substitute for investigation and reason! In fact, those who have least examined their opinions are usually the firmest in holding to them. It is commendable to hold to what we have •seen, but not always to what we have •believed, since we may have overlooked something that could overturn it all. There may be no-one in the world who has the leisure, patience and means to •collect together all the arguments on each side of the questions on which he has opinions, and to •compare these lines of thought so as *safely* to conclude that he knows all he needs to know. However,

the conduct of our lives and the management of our great concerns won't let us delay; and in matters on which we aren't capable of certain knowledge it is absolutely necessary for us to make judgments.

Theophilus: Those remarks are thoroughly sound and good. In certain cases, though, one could wish that men *did* keep written summaries. . . .of the reasons that have led them to some important view that they will often have to justify later on, to themselves or others. Let me add that although it isn't usually permitted in the courts to rescind a judgment after it has been delivered, or to do a revision after having 'come to a conclusion' (otherwise we would have to be in perpetual disquiet, which would be all the more intolerable because we can't always keep records of past events), nevertheless we are sometimes allowed to appeal to the courts on new evidence. . . . It's like that also in our personal affairs and especially in the most important matters, in cases where it is still open to us to plunge in or to draw back, and isn't harmful to •postpone action or to •edge ahead *cautiously*: the pronouncements that ·our minds make on the basis of probabilities should never be taken as so settled that we shan't ever be willing to revise our reasoning in the light of substantial new reasons going the other way. But when there is no time left for thinking things over we must abide by the judgment we have made as resolutely—though not always as inflexibly—as if it were infallible.

Phil: **4** So men can't avoid risking error when they judge, or avoid having differing opinions when they can't see matters from the same point of view; and therefore they ought to maintain peace and decent civility throughout their

differences of belief, and not expect anyone to give up a deep-rooted opinion just because we object to it—especially if he has reason to suspect us, his opponents, of self-interest or ambition or some other personal motive. Those who want to force others to yield to their opinions usually turn out not to have examined things at all well. Nothing violent is to be expected from people who have explored an issue deeply enough to be past any legitimate basis for doubt: *they* don't find much reason to condemn others, and anyway there are very few of them.

Theo: Really, what we are most justified in criticizing is not men's opinions but their immoderate condemnation of the opinions of others—as if only a fool or a knave could judge otherwise than they do! This attitude on the part of those who stir up these passions and hatreds among the people results from a haughty and biased mind that loves to dominate and can't bear to be contradicted. Not that there isn't often good reason to criticize the opinions of others; but this should be done fair-mindedly and with compassion for human frailty. We certainly have the right to protect ourselves against evil doctrines that influence morality and pious observances, but we shouldn't malign people by ascribing these to them without good evidence. Impartiality recommends mercy, but piety commands that when people's dogmas are harmful their bad effects be pointed out where it is appropriate to do so: for example, beliefs that go against the providence of a perfectly good, wise and just God, or against the immortality of souls that lays them open to the operations of his justice; not to mention other opinions that are dangerous to morality and public order. I know that some excellent and well-meaning people maintain that these theoretical opinions have less practical effect than is generally thought. I know too that there are

people with fine characters who would never be induced by *doctrines* to do anything unworthy of themselves; moreover, those who reach these erroneous opinions in the course of theorizing are not only naturally inclined to be above the vices to which ordinary men are prone but also are concerned for the good name of the sect of which they are in effect the leaders. One can acknowledge that Epicurus and Spinoza, for instance, led exemplary lives. But these considerations usually fail to apply to their disciples and imitators; believing themselves to be relieved of the deterrent fear of a God who sees what they do and of a future after-life that threatens them, they let loose their animal passions and apply their thoughts to seducing and corrupting others. If they are ambitious and naturally rather callous they are capable of setting fire to the four corners of the earth for their pleasure or advancement—I *knew* men of this sort (they are dead now [Leibniz was nearly 60 when he wrote this]). I even find that somewhat similar opinions steal gradually into the minds of men in high positions who rule the rest and on whom public affairs depend, and slither into fashionable books, and are in this way tilting everything towards the universal revolution with which Europe is threatened, and are completing the destruction of what still remains in the world of the generous sentiments of the ancient Greeks and Romans. *They* placed love of country and of the public good, and the welfare of future generations, before fortune and even before life. This 'public spirit', as the English call it, is dwindling away and is no longer in fashion; it will die away all the more when it ceases being sustained by the good morality and true religion that natural reason itself teaches us. Among those of the contrary character, which is beginning to prevail, the best have no other principle but what *they* call 'honour'. But for them the mark of an honest man or a man of 'honour' is merely that he won't do

anything that *they* consider base. . . . But let me get back to my main point. . . . In theology criticism is carried even further than in other areas. Those who prize their orthodoxy often condemn their adversaries; and are in turn opposed, even within their own sect, by those who are trying to bring the sects together. The result of this opposition is civil war between the •rigid and the •yielding within a single sect. But it's an encroachment on God's prerogative to deny eternal salvation to those who hold different opinions; so the wisest of the condemners confine themselves to the peril in which, in their view, these erring souls stand; they leave to the special mercy of God those who aren't so wicked that they can't profit from it, and they believe themselves obliged to make every imaginable effort to remove these people from their dangerous position. If these people who think in *this* way about the peril of others have reached their opinion after an appropriate investigation, and if there is no way of undeceiving them, we can't find fault with their conduct as long as they are gentle in how they treat others. But as soon as they go beyond this they violate the laws of impartiality. For they should bear in mind that other people, who are just as convinced as they are, have just as much right to maintain their own views and even to propagate them if they think them important. An exception ·to all this· should be made of opinions that advocate crimes that oughtn't to be tolerated; we have the right to stamp these out by stern measures—even if the person who holds them can't shake himself free of them—just as we have the right to destroy a venomous beast, innocent as it is. But I'm speaking of stamping out the sect, not the men, since we can prevent them from doing harm and from preaching their dogmas.

Phil: 5 Let's return to our topic of the grounds of assent and the degrees of assent—i.e. the different levels of confidence

with which one may assent to a proposition. We should notice that propositions are of two sorts: those of •matter of fact, which concern matters that can be empirically observed and therefore can be accepted on the strength of human testimony; and those of •speculation [here = 'abstract theorizing'], which aren't supportable by such testimony because they concern things that our senses can't reveal to us. **6** When a particular fact is consistent with what we regularly observe and others regularly report, we rely on it as firmly as if it were certain knowledge. And when it conforms with the testimony of all men at all times as far as we can tell, this is the first and highest degree of probability. For example, that fire warms, that iron sinks in water [Locke wrote 'fire warmed' and 'iron sank'.] With that kind of basis for it, our belief rises to *assurance*. **7** Secondly, the historians all report that so-and-so preferred his private advantage to the public interest. Since it has always been observed that this is the practice of most men, the assent that I give to these histories is a case of *confidence*. **8** Thirdly, when there is nothing in the nature of things for or against a factual claim, and it is vouched for by the testimony of people who aren't suspect—for instance, that Julius Caesar lived—it is accepted with *confident belief*. **9** But when testimonies clash with the ordinary course of nature or with one another, the degrees of probability can infinitely vary. Hence arise the degrees that we call 'belief', 'conjecture', 'doubt', 'wavering', 'distrust'. In contexts like these we need to be *exact*, so as to form a right judgment and proportion our assent to the degree of probability.

Theo: [Throughout these pages 'proof' means something like 'rational grounds for belief' or 'chain of evidence'. Even a 'complete proof' is nothing like as strong as a *demonstration*.] When legal theorists discuss proofs, presumptions, conjectures, and evidence, they have a great many good things to say on the subject

and go into considerable detail. They begin with **(1) common knowledge**, where there is no need for proof. They deal next with **(2) complete proofs**, or what pass for them: judgments are delivered on the strength of these, at least in civil actions. In some jurisdictions they are more cautious in criminal actions; in these there is nothing wrong with insisting on **(3) more-than-full proofs**, and above all for the so-called *corpus delicti* [= 'the body of the person who has been killed'] if it is that sort of case. . . . Then there are **(4) presumptions**, which are accepted provisionally as complete proofs—that is, for as long as the contrary is not proved. There are **(5) proofs** that are strictly speaking more than half full; a person who founds his case on such a proof is allowed to take an oath to make up its deficiency. And there are others that are **(6) less than half full**; with these, on the contrary, the oath is administered to the one who denies the charge, to clear him. Apart from these, there are many degrees of conjecture and of evidence. And in criminal proceedings in particular there is evidence sufficient for •applying torture (which itself has varying degrees—i.e. can be more or less severe—depending on what the charge is); there is evidence sufficient for •displaying the instruments of torture and making preparations as though one intended to use them. There is evidence for •arresting the suspect, and for •gathering evidence surreptitiously. The differences amongst these are also serviceable in other analogous situations. The entire form of judicial procedures is, in fact, nothing but a kind of logic that is applied to legal questions and can be applied elsewhere. We see that physicians also recognize many differences of degree among their signs and symptoms. Mathematicians have begun, in our own day, to calculate the chances in games. It was the Chevalier de Méré—a man of acute mind, a gambler and philosopher—. . . who prompted them by raising questions about the division of the stakes,

wanting to know how much a given player's part in a game would be worth if the game were interrupted at such and such a point. Accordingly he enlisted his friend Pascal to take a brief look at the problem. The question caused a stir and prompted Huygens to write his treatise on chance. Other learned men joined in. Certain principles were established, and were also employed by the Dutch leader De Witt in a little Dutch-language discourse on annuities—a topic that brings in •probabilities because the cost at a given time of a lifetime annuity for someone depends on how long that person will •probably live. The foundation they built on involved arriving at an arithmetic mean between several equally admissible hypotheses. Our peasants have used this method for a long time, guided by their natural mathematics. For instance, when some inheritance or piece of land is to be sold, they appoint three teams of assessors. . . . each of which assesses the commodity in question. If the first estimates its value at 1000 crowns, the second at 1400 and the third at 1500, they take the total of these three and divide it by three, arriving at 1300 as the mean value sought. . . . This is the axiom that *similar hypotheses must receive similar consideration*. But when the hypotheses are unlike, we compare them with one another. Suppose, for instance, that with two dice one player will win if he throws a 7 and the other if he throws a 9. We want to know their comparative likelihoods of winning. I say that the second player is only two thirds as likely to win as the first player, since there are three ways for the first to throw a 7 with two dice—1 and 6, or 2 and 5, or 3 and 4—whereas there are only two ways for the second to throw a 9, namely 3 and 6, or 4 and 5. And all these ways are equally possible. So that the likelihoods, which match the numbers of equal possibilities, will be as 3 to 2. I have said more than once [pages 88, 184] that we need a new kind of logic, concerned with degrees

of probability, since Aristotle in his *Topics* couldn't have been further from it. . . . Anyone wanting to deal with this question would do well to pursue the investigation of *games of chance*. In general, I wish that some able mathematician were interested in producing a detailed study of all kinds of games, carefully reasoned and with full particulars. This would be of great value in improving discovery-techniques, since the human mind appears to better advantage in games than in the most serious pursuits.

Phil: 10 The law of England observes this rule:

A copy of a record is a good proof if it is acknowledged to be authentic by witnesses, but a copy of a copy is not to be admitted as a proof however well attested it is, and however credible the witnesses are.

I have never yet heard of anyone who criticized this wise precaution. It at least carries the message that the further off any •testimony is from the original truth that lies in •the thing itself, the less force it has. In contrast with this, some men think in the opposite way, treating opinions as gaining force by growing older. Something that a thousand years ago wouldn't have appeared at all probable to any rational man who was a contemporary of •the person who first testified to it is now urged as certain because many people have related it on the strength of •his testimony.

Theo: Scholars in the field of history have great respect for contemporary witnesses to things; though the principal claim to credence, even of a contemporary, is restricted to public events. Still, when he speaks of motives, secrets, hidden machinations, and such uncertain matters as poisonings and assassinations, one does at least learn what various people have believed. [Theophilus continues at considerable anecdotal length about history and some recent historians. In passing, he deplores use of 'the word "Lutheranism",

which had common usage has sanctioned in Saxony'.]

Phil: 11 Don't think that my remarks are meant to lessen the credit and usefulness of history. We receive from history a good proportion of the useful truths we have. . . . Nothing is more valuable than the records of antiquity, I think. I wish we had more of them, and more uncorrupted. But it remains the case that no copy can rise above the certainty of its first original.

Theo: When we have just one writer of antiquity to attest to some fact, then certainly none of those who have copied what he said have added any weight to it—indeed they should all be entirely disregarded. What they say should be treated exactly as though it had been said only once. . . . Legal scholars have written about historical credibility, but the topic would be worth a more painstaking inquiry, and some of these gentlemen haven't been demanding enough. As for remote antiquity, some of the most resounding 'facts' are dubious. [He gives examples at length. Then:] But when the histories of different nations converge, in situations where it isn't likely that one has been copied from the other, that is powerful evidence of truth. The agreement in many things between Herodotus and the history of the Old Testament is like that. . . . Again, those who are trying to establish the facts get satisfaction from the agreement between •Arabic, Persian and Turkish historians on the one hand and •Greek, Roman and other western ones on the other; as also from the way books that have come down to us from the ancients, and are indeed copies of copies, are attested to by the medals and inscriptions that have survived from ancient times. It remains to be seen what more the history of China will teach us when we are better equipped to make judgments about it so that it comes to have an inherent credibility. History is useful mainly for •the satisfaction one gets from knowing

about origins, for •the justice that is done to men who have deserved well of others, for •the establishment of historical scholarship, especially in sacred history which contains the foundations of revelation, and for •the useful lessons we can learn through examples. (There is also the matter of the genealogies and entitlements of princes and powers!) I'm not scornful of the sifting of the materials of antiquity right down to the tiniest trifles, for sometimes the knowledge scholars draw from these can be helpful in more important matters. I'm willing, for instance, that the entire history of clothing and tailoring should be written, from the vestments of the Hebrew priests, or if you like from the coats of skins that God gave to Adam and Eve when they left Paradise, right through to the wigs and flounces of our own times; introducing also whatever can be inferred from ancient sculptures and from paintings several centuries old. . . . But I wish there were people willing to devote themselves to the task of deriving the most useful things from history—such as unusual examples of virtue, remarks about the conveniences of life, and political and military stratagems. And I wish that someone would write a sort of universal history that was explicitly restricted to things like that and some others of the most significant kind; for sometimes one will read a big history-book, one that is learned, well written, just right for its author's purpose, and excellent of its kind, but containing almost nothing in the way of useful lessons. By that I don't mean simple moralizings. . . .but rather skills and items of knowledge that not everyone would think of just when they were needed. I wish further that books of travel were used as a source for endless profitable things of this nature and that they were organized according to their subject matters. But it is astonishing that with so many useful things still to be done men nearly always spend their time on what has been done already, or on what is utterly useless, or anyway on the least

important things; and I can see virtually no remedy for this until, in calmer times, society at large takes more of a hand in these matters.

Phil: 12 Let us turn from the probabilities of matters of fact to the probabilities of opinions on matters that don't admit of ·eye-witness· testimony because they don't come within reach of our senses. For example, opinions about •the existence and nature of Spirits, angels, devils and so on; •about what corporeal substances there are in the planets and other parts of the vast universe; and, lastly, •about the inner workings of most of the works of nature. In all these areas we can only conjecture, with probabilities being assigned mainly on the basis of *analogy*. For since these matters can't be attested to, they can appear probable only in proportion as they agree to truths that *are* established. Since rubbing two bodies together violently produces heat and even fire, we judge that fire ·in general· consists in a violent agitation of imperceptible parts; and since the refractions of transparent bodies make colours appear, we judge that colours whose origins we don't see come from a similar kind of refraction. In all parts of the creation that we can observe we find a gradual connection without any great gaps in between; and this gives us reason to believe that by such gentle steps things ·in general· ascend upwards in degrees of perfection. It's hard to say where exactly the line falls separating things that can *sense* from ones that can't, things that can *think* from ones that can't, and things that are ·*alive* from ones that aren't. . . . There's an enormous difference between some men and some brute animals, but there are also some men whose level of understanding and ability differs so little from that of some brutes that we'll find it hard to say that in those respects those men are above those brutes. Well, then, observing such gradual and gentle

descends downwards in the parts of the creation that are lower than man, right down to the lowest, the rule of *analogy* leads us to think it probable that the same gradualness in differences of level applies also to things that are above us and out of our observation. This sort of probability is the great foundation of rational hypotheses.

Theo: It is on the basis of this kind of reasoning from analogy that Huygens judges that the other principal planets are in a condition much like our own, except for differences that are bound to arise from their different distances from the sun. . . . Until we discover telescopes like those of which Descartes held out hope, which would let us pick out on the lunar surface things no bigger than our houses, we shan't be able to settle what there is on any globe other than ours. Our conjectures about the inner parts of terrestrial bodies will be more useful and more open to confirmation: I hope that on many matters we shall get beyond mere conjecture; and I believe that at least the violent agitation of the parts of fire, which you mentioned a moment ago, shouldn't be counted amongst the merely probable things. It is a pity that Descartes's hypothesis about the structure of the parts of the visible universe has had so little confirmation from subsequent research and discovery, or that Descartes didn't live fifty years later so that he could give us as ingenious an hypothesis for our present knowledge as he gave for what was known in his time. As for the gradual connection of species: we have already had something to say about that in a previous discussion, when I commented that philosophers have in the past reasoned about a vacuum among forms or among species [see page 142]. In nature everything happens by degrees, nothing by jumps; and this rule about change is one part of my law of continuity. But the beauty of nature, which insists on perceptions that stand out from one another, asks

for the appearance of jumps and for musical cadences (so to speak) amongst phenomena, and takes pleasure in mingling species. Thus, although in some other world there may be species intermediate between man and beast (depending on what senses the words 'man' and 'beast' are taken in), and although in all likelihood there are *somewhere* rational animals that surpass us, nature has seen fit to keep these at a distance from us so that there will be no challenge to our superiority on our own globe. I speak of intermediate *species*, and I wouldn't want to handle this matter in terms of human individuals who resemble brutes, because they are probably members of the same species as the rest of us: it is likely that what they suffer from is not a lack of the faculty of reason but some blockage that prevents it from being exercised. So I believe that the stupidest man (if he is not in a condition that is contrary to nature, through illness or some other permanent defect that works like an illness) is incomparably more rational and teachable than the most intellectual of all the beasts; although the opposite is sometimes said as a joke. I would add that I strongly favour inquiry into analogies: more and more of them are going to be yielded by plants, insects and the comparative anatomy of animals, especially as the microscope continues to be used more than it has been. And in regard to more general matters, my views about monads will be found manifested everywhere—views about

- their endless duration,
- the preservation of the animal along with the soul,
- the occurrence of confused perceptions in a certain state such as that of death in simple animals,
- the bodies that can reasonably be attributed to Spirits, and
- the harmony between souls and bodies, such that each perfectly follows its own laws without being dis-

turbed by the other and with no need for a distinction between voluntary and involuntary.

It will be found, I claim, that •all these views are in complete conformity with the analogies amongst things that come to our notice; that •all I'm doing is to apply my views beyond our observations, not restricting them to certain portions of matter or to certain kinds of action; and that •the only difference between what we observe and what we don't is that between large and small, between sensible and insensible.

Phil: 13 Nevertheless, there is one case where we give weight not so much to •the analogy with natural things that we have encountered in experience as to •the contrary testimony of a strange fact that is remote from our experience. For where supernatural events are suitable to the ends of •God who has the power to change the course of nature, we have no grounds for refusing to believe them when they are well attested. This is the case of miracles. . . . **14** Finally, there is a testimony that is superior to every other kind of assent. It is *revelation*, the testimony of God, who can neither deceive

nor be deceived; and our assent to it is called *faith*, which excludes all wavering as completely as the most certain knowledge does. But it is important to be sure that it is a divine revelation and that we have understood it correctly; otherwise we'll be exposed to fanaticism and to the errors of a wrong interpretation. If in a given case it is only *probable* that it was a revelation and only *probable* that it means such-and-such, our level of assent to such-and-such can't be higher than is warranted by those two probabilities. But we'll say more about this later on.

Theo: The theologians distinguish •rational grounds for belief, along with the natural assent that can arise only from such grounds and that can't have a higher probability than they have, from •the supernatural assent that is brought about by divine grace. Whole books have been devoted to the analysis of faith: they somewhat disagree amongst themselves, but since we are going to treat of the topic later, I don't want to anticipate now what we shall have to say in the proper place.

Chapter xvii: Reason

Philaethes: 1 Before separately discussing the topic of •faith let us deal with •reason. Sometimes reason is taken for

•true and clear principles,

•as in the statement '*That the whole is bigger than the part is a truth of reason*'; sometimes for

•deductions from those principles,

•as in the statement '*He reached the theorem by applying reason to Euclid's premises*'; sometimes for

•the cause, and particularly the final cause,

•as in the statements '*The reason for the flood was the breaking of the levees*' (the efficient cause), '*His reason for*

confessing to the crime was to get a lighter sentence' (the final cause). But I'm going to be considering reason as

- the faculty that is supposed to distinguish man from the beasts, and in which he obviously much surpasses them,

- as in the statement 'Men are different in kind from beasts because men have reason whereas beasts don't'. **2** We need this faculty both for the enlargement of our knowledge and for regulating our opinion. Properly understood, it consists of two faculties—•sagacity in the finding of intermediate ideas, and •the faculty for drawing conclusions or inferring. **3** We can distinguish four stages in a use of reason: **(1)** discovering a proof; **(2)** ordering it so that the connections it involves may be seen; **(3)** being aware of each of those connections; **(4)** drawing a conclusion. These stages can be observed in mathematical demonstrations. [We are about to encounter something that needs to be explained. Since Kant, the expression *a priori* has meant '[knowable] just by thinking', in contrast with *a posteriori* = '[knowable] only by consulting one's sense-experience'. Leibniz sometimes used it like that, but in Theophilus's next speech *a priori* is used in an older sense in which an *a priori* reason for proposition *P* is a *reason why P is true* as distinct from a *reason for believing that P is true*. Some occurrences of *a priori* earlier in the work might be taken either way.]

Theophilus: A reason is a known truth whose connection with some less well-known truth leads us to give our assent to the latter. But it is called a reason, especially and par excellence, if it is the cause not only of •our judgment but also of •the truth itself—which makes it what is known as an *a priori* reason. A

cause in the realm of things

corresponds to a

reason in the realm of truths,

which is why causes themselves—and especially final ones—are often called reasons. And, lastly, the faculty that is aware of this connection amongst truths, i.e. the faculty for reasoning, is also called 'reason', and that's the sense in which you are using the word. Now, here on earth this faculty really is exclusive to man alone and doesn't appear in any other animals on earth; for I showed earlier [page 126] that the shadow of reason that can be seen in beasts is merely an expectation of a similar outcome in a case that seems to resemble the past, with no knowledge of whether the same reason obtains. And that is just how men behave too, in cases where they are merely empirics [see note on page 2]. But they rise above the beasts when they see the connections between truths—connections that themselves constitute necessary and universal truths. These connections may be necessary even when all they lead to is an opinion; this happens when after precise inquiries one can demonstrate on which side the greatest probability lies, so far as that can be judged from the given facts; these being cases where there is a demonstration not of •the truth of the matter but of •which side it would be prudent to adopt. . . .

Phil: **4** *Syllogism* is generally thought to be the proper instrument of reason and the most useful way of employing this faculty. I doubt this, because it serves only to show the connection of the proofs in any one instance, and no more; but the mind sees that connection just as easily, and perhaps better, without that aid. [Philalethes develops a three-page attack on syllogisms, which Theophilus counters with a seven-page defence—both omitted from this version.]

Phil: I'm starting to form an entirely different idea of logic from my former one. I took it to be a game for schoolboys, but I now see that, in your conception of it, it involves a sort of universal mathematics. God grant that it may be

developed beyond its present state, to become a ‘true help of reason’ (adapting a phrase of Hooker’s), which would raise men well above their present condition. And reason is a faculty that has all the more need of it, since **9** its extent is quite limited and in many cases it lets us down. This is **(1)** because we often lack the ideas themselves. **10** Also, **(2)** they are often obscure and imperfect; whereas when they are clear and distinct, as in the case of numbers, we meet with none of those inextricable difficulties and fall into no contradictions. **11** **(3)** We are often in difficulty also through lack of intermediate ideas. Algebra is a great instrument and a remarkable proof of human sagacity; and we know that before it was discovered men looked with amazement at many of the demonstrations of ancient mathematicians. **12** **(4)** It also happens that we proceed on false principles, which can engage us in difficulties; and reason, so far from clearing these away, entangles us the more. **13** **(5)** Lastly, words whose meaning is uncertain puzzle the reason.

Theo: I’m not convinced that **(1)** ideas—distinct ideas, that is—are as lacking to us as you believe. As for **(2)** confused ideas or rather images—or ‘impressions’ if you prefer—such as colours, tastes and so on, resulting from various tiny ideas that are distinct in themselves though we aren’t distinctly aware of them: we lack an infinity of these that befit other creatures more than they do ourselves. But the role of these impressions is to provide us with natural inclinations, and to provide a grounding for observations of experience, rather than to furnish materials for reasoning—except when distinct perceptions come with them. So what holds us back is primarily the inadequacy of our knowledge of these distinct ideas concealed within the confused ones; and even when everything is revealed distinctly to our senses or our minds, it sometimes happens that so many things must be

taken into account that their sheer number confuses us. For instance, if we had a thousand cannon-balls heaped up in front of us, and wanted to take in the number and the mathematical properties of this assemblage, it would obviously be a great help to arrange them in patterns, as they do in arsenals, so as to have distinct ideas of them and to fix them in our minds so that we needn’t trouble to count them more than once. In the science of numbers themselves, great difficulties arise because so many things have to be taken into account: what we are looking for are short formulae, but we don’t always know in a given case whether such a formula is there to be found. For instance, what is simpler in appearance than the notion of a prime number? That is, a whole number divisible only by itself and unity. And yet we are still hunting for an easy, positive criterion by which they can be identified with certainty, without having to try out all the prime divisors less than the square root of the prime in question. There are plenty of criteria that in many cases show without much calculation that a given number *isn’t* prime; but we want one that is easy and that shows decisively, for any prime number, that it *is* prime. That is also why algebra is still so imperfect, even though nothing is better known than the ideas it employs, since they merely signify numbers in general; but people still lack the means of extracting the irrational roots of any equation higher than the fourth degree (except in very restricted cases). [He goes into technical detail about this problem.] This difficulty shows that even the clearest and most distinct ideas don’t always yield us all that we want and all that could be derived from them. And this leads to the conclusion that algebra falls far short of being *the* art of discovery, since even it needs the assistance of a more general art. Indeed, we can say that generalized algebra or the art of symbols is a marvellous aid, in that it unburdens the imagination. . . . No doubt the

ancients had something of it. Viète gave it wider scope by using general symbols to express not only •the unknown number that is to be discovered• but also •the numbers that are given in the setting of the problem—thereby doing in calculation what Euclid had already done in reasoning. And Descartes extended the application of this calculus to geometry by representing lines by equations. [He tells an anecdote about an awe-inspiring mathematical discovery that Archimedes made concerning spirals. Then:] The new infinitesimal calculus. . . which I have discovered and made public with good results provides a general procedure in terms of which this discovery about spirals is mere child's play and the simplest of exercises, like almost everything that had previously been found out about the mensuration of curves. This new calculus is better, also, because it unburdens the imagination in the case of those problems that Descartes excluded from his *Geometry*—because they usually bring in mechanical considerations, *he said*, but really because they didn't suit his method of calculation! As for the errors that arise from (4) ambiguous terms and (5) false principles, it's up to us to avoid them.

Phil: 14 There is also a case where reason can't be applied, but where we also don't need it and where vision is better than reason. This is in *intuitive* knowledge, where the connection of ideas and of truths is immediately seen. Knowledge of indubitable maxims consists in this; and I'm inclined to think that this is the degree of evidentness that angels have now, and that the perfected spirits of good men will have in the after-life of thousands of things that we in this life can't take in. 15 But demonstration based on intermediate ideas yields *rational* knowledge. This is because there is a necessary connection between the intermediate idea and each of the two ideas flanking it—a connection that

is seen by laying evident truths side by side, like applying a yard-stick first to one piece of cloth and then to another, to show that they are equal. 16 But if the connection is only probable, the judgment yields only an opinion.

Theo: Only God has the privilege of having nothing but intuitive knowledge. The souls of the blessed, and Spirits, have knowledge that is incomparably more intuitive than ours; they often see at a glance what we can only discover by using inference and expending time and effort. But the souls of the blessed, however detached they are from gross bodies like ours, must also encounter difficulties in their path; otherwise they wouldn't enjoy the pleasure of discovery, which is one of the greatest pleasures. And the same holds for Spirits, however sublime they are. It must be acknowledged that for both groups there will always be an infinity of truths that are hidden, either entirely or for a while, which they must arrive at through inference and demonstration or even by conjecture in many cases.

Phil: So these Spirits are just animals like ourselves, only more perfect. It is as though you were to say, like •the fictional• Harlequin, the Emperor of the Moon: *It's just like here!* [This comparison isn't Locke's. It was Leibniz who was fond of referring to a popular farce in which Harlequin, 'emperor of the moon', says on earth that how people behave on the moon is 'just like here'.]

Theo: I do say that; not in every respect, since the kinds and levels of perfection vary infinitely, but as regards the foundations of things. *The foundations are everywhere the same*; this for me is a basic maxim that governs my whole philosophy. I conceive •unknown and •confusedly known things always in the manner of •things that are distinctly known to us. This makes philosophy very easy, and I really believe it's how it should be carried on. But if this philosophy is the simplest in resources it is also the richest in kinds

of effects, because nature *can* vary these infinitely—and so it *does*, with the greatest imaginable abundance, order and adornment. This is why I believe that there is no Spirit, however exalted, who doesn't have an infinite number of others superior to him. However, although we are much inferior to so many intelligent beings, we have the privilege of not being visibly over-mastered on this planet, on which we hold unchallenged supremacy; for all the ignorance in which we are plunged, we still have the satisfaction of not *seeing* anything that outdoes us. . . . Of course, I'm speaking here only about the •natural knowledge of these Spirits, and not about the •beatific vision or about the supernatural insights that God chooses to give them.

Phil: 19 Since everyone employs reason either on his own account or in dealing with others, let us think about four sorts of arguments that men commonly use •to get others to assent or at least •to awe them into silence. [He gives these arguments Latin names, of which only one is preserved here.] **(1)** In argument one may bring forward the opinions of men whose learning, eminence, power or some other cause has gained them authority. For when a man doesn't readily give in to these opinions he's apt to be criticized as being full of vanity, and even accused of insolence. **20 (2)** Or one may require one's adversary to accept what one is saying or else produce something better. **21 (3)** There is *argumentum ad hominem* [Latin = 'argument aimed at the man'], in which things the adversary himself has said are used in one's argument against him. **22 (4)** One may argue using proofs drawn from any of the foundations of knowledge or probability. This is the only one of them all that advances and instructs us. For if **(1)** out of respect I dare not contradict you, or if **(2)** I have nothing better to say, or if **(3)** I contradict myself, it doesn't at all follow that you are right. I may be **(1)** modest, **(2)** ignorant, **(3)** in error, and still you may be in error too.

Theo: We must certainly distinguish what it is good to say from what it is correct to believe; but since most truths can be boldly upheld, **(1)** when an opinion has to be concealed that creates a presumption against it. The kind **(2)** of argument is sound in cases where there is a presumption which makes it reasonable to hold to one opinion until its contrary is proved. What the **(3)** argument *ad hominem* achieves is to show that one or other assertion is false and that one's adversary is mistaken however one takes him. Other arguments that people use could be mentioned, for instance the one that goes like this: 'If this proof is not accepted, we have no way to attain certainty about the matter in question, which is absurd.' This argument is sound in certain cases—for instance, if someone wanted to deny basic immediate truths such as that *nothing can both be and not be at the same time* or that *we ourselves exist*; for if he were right there would be no way of knowing anything whatever. But when someone has devised certain principles, and wants to uphold them on the ground that without them some accepted doctrine would collapse, the argument isn't conclusive. Because we need to distinguish •what is necessary to uphold our knowledge from •what serves as a foundation for our accepted doctrines or practices. Legal scholars have sometimes used a similar line of reasoning in defence of condemning or torturing alleged sorcerers on the testimony of others accused of the same crime. 'If this argument [here = 'source of evidence'] is rejected', they have said, 'how can we convict them?' And some writers maintain that in the criminal cases where it is harder to obtain conviction, weaker evidence can be accepted as adequate. But that is no reason. All that follows is that •we must employ greater care, not that •we ought to believe more readily; except with extremely dangerous crimes—such as high treason, for example—where this consideration *does* carry weight, not

in condemning a man but in preventing him from doing harm. So there can be a middle course, not between •guilt and •innocence, but between •condemnation and •acquittal, where law and custom permit such ·middle· judgments. . . .

Phil: 23 Having said a little about the relation of our reason to other men, let me add something about its relation to God. This requires that we distinguish what is

•contrary to reason—i.e. inconsistent with our clear and distinct ideas

from what is

•above reason—i.e. something whose truth or probability we don't see to be derivable by reason from sensation or from reflection.

Thus the existence of more than one God is contrary to reason; the resurrection of the dead is above reason.

Theo: If you mean your definition of 'above reason' to capture the accepted use of this phrase, I have a comment to make about it. It seems to me that your way of putting this definition makes it too weak in one respect and too strong in another. ·Too weak·: According to your definition everything we don't know and lack the capacity to know in our present state would be above reason. For instance, whether such-and-such a fixed star is larger or smaller than the sun, or whether Vesuvius will erupt in such-and-such a year—knowledge of these facts is beyond us, not because they are 'above reason' ·in the ordinary sense of that phrase· but because they are above the senses. After all, we could judge very soundly about these matters if we had more perfect organs and more information as to the facts. There are also problems that are above our *present* faculty of reason but not above *all* reason. For instance, no astronomer on earth could calculate the particulars of an eclipse in his head in the time it takes to recite the Lord's prayer; yet there

may be Spirits for whom that would be mere child's play. Thus all these things could become known or achievable with the help of reason if we had fuller information as to the facts, more perfect organs and more exalted minds.

Phil: If I take my definition to include not only *our* sensation and reflection but also that of any other possible created mind, then that objection fails.

Theo: That is so; but then there will be the other difficulty. Too strong: by your definition ·understood in that way· nothing will be above reason, because God can always bestow the means of finding out any truth whatever through sensation and reflection. Indeed, the greatest mysteries are made known to us by God's testimony, which we recognize through the rational grounds for belief on which our religion rests—grounds that unquestionably depend on sensation and reflection. The question, then, seems to be not whether the existence of a fact or the truth of a proposition can be deduced from the sources that reason employs (from sensation and reflection, that is, or rather from the outer and inner senses), but whether a created mind is capable of knowing the *why* of this fact, the reason that makes it true. Thus we can say that what is above reason can indeed be learned, but can't be *understood*, by the methods and powers of created reason, of however great and exalted a kind. It is God's unique privilege to understand it, as it is his sole prerogative to proclaim it.

Phil: That view of the matter appears sound to me, and that is how I want my definitions to be understood. This same approach also confirms me in my opinion that 24 the way of speaking in which •reason is opposed to •faith, though authorized by common use, is improper. For it is by reason that we establish what we ought to believe. Faith is a firm assent; and when assent is regulated as it should be, it

can't be based on anything but good reason. Someone who believes something without having any reason for his belief may be in love with his own fancies, but he isn't seeking the truth and he isn't being obedient to ·God·, his divine master who wants him to use the faculties he has given him as guards against error. If his belief is true, it is by chance; and if it is wrong, that's his fault and he is accountable to God for it.

Theo: I applaud you for maintaining •that faith is grounded in reason; otherwise why would we prefer the Bible to the Koran or to the ancient writings of the Brahmins? Our theologians and other learned men have also thoroughly recognized •this; that is why we have such fine works on the truth of the Christian religion, and so many fine arguments against the pagans and other unbelievers, ancient and modern. Furthermore, wise men have always been suspicious of anyone maintaining that there's no need to trouble with reasons and proofs when it is a question of belief. Indeed one *can't* separate belief from reasons unless 'believing' something merely means reciting it, or giving in to it without giving it any thought. Many people do just

this, and it is typical of some nations, even, more than of others. . . . In our own day a high-ranking person has said that in questions of faith we have to put out our eyes in order to see clearly, and Tertullian said somewhere: 'This is true because it is impossible; we must believe it because it is absurd.' But even if people who say such things have good intentions, what they say is extravagant and apt to do harm. St Paul speaks more correctly when he says that the wisdom of God is foolishness to men [1 Corinthians 2:14]. This is because men judge things only in accordance with •their limited experience, seeing as absurd anything that doesn't conform with •it. But it would be very rash to judge that such a thing is absurd; there are in fact countless natural things that would seem just as absurd to us if we were merely *told* about them—like describing the formation of ice to someone who has never experienced it. But the order of nature itself is not metaphysically necessary; so it is grounded solely in God's good pleasure; so he can depart from it for higher reasons of grace. But we shouldn't infer that he *has* done so except on good evidence, which can come only from the testimony of God himself—testimony to which we must utterly defer once it has been duly confirmed.

Chapter xviii: Faith and reason, and their distinct provinces

Philaethes: 1 Let us adapt ourselves to common usage, and allow faith to be distinguished from reason in a certain way. But this way should be explained clearly, and the boundaries between the two should be established; for the unsettled nature of the boundaries of faith and reason has

been the cause of great disputes (and perhaps even great disorders) in the world. Obviously, until those boundaries are settled we shall dispute in vain, since reason must be used in disputing about faith! 2 I find that every sect is glad to use reason when they think it will help them, and when

it lets them down they cry out 'It's a matter of faith, and is above reason'. But this is a dangerous line for them to take, because when they are engaged in reasoning with an opponent *he* can use the same plea, unless they can show why he isn't permitted to use it in what seems to be a parallel case. I am here taking 'reason' to be

the discovery of the certainty or probability of propositions that are deduced from knowledge acquired through the use of our natural faculties, i.e. by sensation or reflection.

And I am taking 'faith' to be

the assent to a proposition on the basis of revelation, i.e. as having been made known to men by God in an extraordinary way of communication.

3 But not even a man inspired by God can communicate to others any new simple ideas, because he can only use words or other signs that revive in us the simple ideas—or combinations thereof—that custom has attached to them. Thus, whatever new ideas St Paul received when he was rapt up into the third heaven, all he could say about them was that 'they are such things as eye has not seen, nor ear heard, nor has it entered into the heart of man to conceive'. Suppose that on the planet Jupiter there were creatures endowed with six senses, and that God supernaturally gave the ideas of that sixth sense to a man among us: that man couldn't by words produce them in the minds of other men. So original revelation needs to be distinguished from traditional revelation. The former is an impression that is made on the mind immediately by God, and there are no limits to what its content might be. The other comes only by the ordinary ways of communication, and can't provide any new simple ideas. **4** Truths that are discoverable by reason could instead be communicated to us through a traditional revelation, as would have been the case if God had chosen

to communicate the theorems of geometry to men—though that wouldn't have given us as much certainty as if we had demonstrated the theorems from the connections of ideas. Likewise, Noah had a more certain knowledge of the flood than we have from Moses' book; just as the certainty of someone who saw that Moses actually wrote it, and that he performed the miracles that show that he was inspired, was greater than our own. **5** This is why revelation can't go against the clear evidentness of reason; because even if the revelation is immediate and original—i.e. even if it consists in God's telling someone something—we have to know for sure that it was God speaking and that he did mean what we took him to mean; and the evidentness of *this* can never be greater than the evidentness of our intuitive knowledge. So no proposition can be accepted as divinely revealed if it contradicts this immediate knowledge that reason gives us. If we don't take that line we'll be left with no difference between truth and falsehood, no standards for separating what is credible from what isn't. Anyway, it is inconceivable that God, our generous creator, should tell us something which if accepted as true must overturn all the foundations of our knowledge and make all our faculties useless. **6** And those who receive revelation not immediately but only through transmission by word of mouth or by writing have all the more need of reason to assure them of its authenticity. **7** It remains true, though, that things that our natural faculties can't discover—things like the fall of the rebellious angels and the resurrection of the dead—are the proper matter of faith. **9** In these matters, only revelation should be listened to. And where probable propositions are concerned, an evident revelation will determine us even against probability.

Theophilus: If you take faith to be only •what rests on rational grounds for belief, and separate it from •the inward grace that immediately endows the mind with faith, everything you say is beyond dispute. For there's no denying that many judgments are more evident than the ones that depend on those rational grounds. People vary in how far they go with faith based on reasons; and indeed plenty of people, far from having weighed up such reasons, have never known them and consequently don't even have grounds for *probability*. But •the inward grace of the Holy Spirit makes up for this, immediately and supernaturally, and it is •this that creates what theologians call 'divine faith' in the strict sense. It's true that God never bestows this faith unless what he is making one believe is grounded in reason—otherwise he would undercut our ability to recognize truth, and open the door to enthusiasm—but it isn't necessary that all who have this divine faith should know those reasons, let alone that they should have them perpetually before their eyes. ['Enthusiasm', like its French counterpart, was used to mean 'intense, fanatical conviction that one is hearing directly from God'. It is the topic of xix.] Otherwise none of the unsophisticated or of the feeble-minded—now at least—would have the true faith, and the most enlightened people might not have it when they most needed it, since no-one can always remember his reasons for believing. The question of the use of reason in theology has been one of the liveliest issues, between Socinians and those who may be called Catholics in a broad sense of the term, as well as between Reformed and Evangelicals—the latter being the preferable name that is given in Germany to those whom some people inappropriately call 'Lutherans'. . . . In general one can say that the Socinians are too quick to reject everything that fails to conform to the order of nature, even when they can't conclusively prove its impossibility. But sometimes their adversaries also go too far and push mystery

to the verge of contradiction, thereby wronging the truth they seek to defend. . . . The able Father Honoré Fabri denied the validity in divine matters of •the great principle that *things that are the same as a third thing are the same as each other*. Some other theologians still do so. This hands the victory to one's opponents, and deprives all reasoning of any certainty. What ought to be said rather is that in divine matters •the principle has been misapplied. . . . Principles of reason that are necessary because they have logical necessity—i.e. ones whose negations imply contradictions—should and can be safely employed in theology. But it isn't true that anything that is necessary merely through physical necessity (i.e. necessity founded on induction from what takes place in nature, or on natural laws that God voluntarily set up) is sufficient to rule out belief in a mystery or a miracle, since God is free to change the ordinary course of things. Thus, going by the order of nature one can be confident that •one person can't be at once a mother and a virgin, and that •a human body can't be inaccessible to the senses; though the contrary of each of these is possible for God. . . . It seems to me that a question remains that hasn't been investigated thoroughly enough by authors who have debated this matter. It is this:

Suppose that on the one hand we have the literal sense of a text from Holy Scripture, and on the other we have a strong appearance of a logical impossibility or at least a recognized physical impossibility; then is it more reasonable to give up the literal sense or to give up the philosophical ·or scientific· principle?

There are certainly passages where there is no objection to abandoning the literal sense—for instance, where Scripture gives God hands, or attributes to him anger, repentance and other human feelings. [Up to here in this speech there has been some reporting on published debates between

theologians—omitted from the present version—and from here on there are several pages more of the same sort of thing. Much of it concerns arguments about the fate in the after-life of ‘virtuous pagans’ and children who die unbaptised. Theophilus winds the discussion up thus:] The

wisest course is to take no position regarding things of which so little is known, and to be satisfied with the general belief that God can do nothing that isn’t entirely good and just. As Augustine said, ‘It is better to doubt concerning what is hidden than to argue over what is uncertain.’

Chapter xix: Enthusiasm

Philaethes: If only all theologians, including St Augustine himself, had always acted on the maxim expressed in that passage! **1** But men believe that their spirit of dogmatism shows how much they care about the truth; when really it’s just the opposite—we really love truth only in so far as we love to examine the proofs that show it to *be* the truth. And when someone jumps to a conclusion he is always driven by less high-minded impulses. **2** A quite common one is a •domineering disposition; **3** and another, which gives rise to enthusiasm, is a certain •complacent satisfaction with our own day-dreams. ‘Enthusiasm’ is the name given to the defect of someone who thinks that something that isn’t grounded in reason is an immediate revelation. **4** We can say that

reason is natural revelation, of which God is the author just as he is the author of nature,

and •parallel with that• we can say that

revelation is supernatural reason, that is, reason enlarged by a new set of •discoveries communicated by God immediately.

But these •discoveries are possible only if we have means to recognize them, and that’s precisely what reason is. To take

away reason so as to make way for revelation would be like putting out one’s eyes to get a better view of the moons of Jupiter through a telescope! **5** Enthusiasm is encouraged by the fact that an immediate revelation is easy and short, compared with a long, tedious and not always successful labour of reasoning. [He talks about the psychological roots of enthusiasm, its harmfulness, and the difficulty of curing it. Then:] **8** Fanatics liken their opinions to matters of seeing and feeling. They see the divine light as we see sunlight at noon, •they say•, and they don’t need the twilight of reason to show it to them! **9** They are sure because they are sure, and their conviction is right because it is strong—for that’s all their metaphorical language amounts to. **10** But as there are two perceptions—of the proposition and of the revelation—they can be asked *where* the clear light is to be found. If what they clearly see is •that the proposition is true, then they don’t need a revelation •telling them that it is true•. So •the alleged clearness• must be in •the feeling that they are receiving a revelation; but how can they see that it is God who reveals it, and that it isn’t a will-o’-the-wisp that leads them continually round in this circle: *It is a revelation because they firmly believe it, and they believe it because it*

is a revelation. [He goes on about how uncritical zeal lays one open to error, how we must use *reason* to distinguish God's speech from Satan's, and how revelations reported in the Bible were accompanied with miraculous outward signs—e.g. Moses heard a voice from within a bush that burned without being burned up. Then:] **16** However, I don't deny that God does sometimes bring important truths into men's minds, or stir them to good actions, by the immediate influence and assistance of the Holy Spirit without any extraordinary signs accompanying it. But in such cases we have reason and the Scripture, two unerring rules for judging these 'illuminations'. For if they conform to these rules we at least *run no risk* in viewing them as •inspired by God, even if not as •immediate revelations.

Theophilus: 'Enthusiasm' was at first a favourable name. Just as 'sophism' indicates literally an exercise of wisdom, so 'enthusiasm' signifies that there is a divinity inside us. [These are the meanings of the ancient Greek words from which 'enthusiasm' and 'sophism' are derived.] Socrates claimed that a God or Daemon gave him inner warnings, so that enthusiasm in his case would be a divine instinct. But men treated their passions as holy, and took their fancies and dreams and even their ravings to be something divine, so that 'enthusiasm' began to signify a disorder of the mind ascribed to the action of some god that was supposed to be inside those who were seized by it. For prophets and prophetesses. . . did manifest mental derangement while their god had possession of them. More recently the term has been applied to people who believe, for no good reason, that their impulses come from God. [He illustrates this with an example from Latin literature. Then:] Today's enthusiasts believe that they also receive doctrinal instruction from God. The Quakers are convinced of this, and their first systematic writer, Barclay, claims that they

find within themselves a certain light which itself announces what it is. But why call something 'light' if it doesn't cause anything to be seen? I know that there are people with that cast of mind, who see sparks and even something brighter; but this image of corporeal light, aroused when their minds become over-heated, brings no light to the mind. [He reports, with an example, that 'enthusiasts' sometimes say or do things that astonish themselves and others. Then:] There are people who, after a period of austere living or of sorrow, experience peace and consolation in the soul; this delights them, and they find such sweetness in it that they believe it to be the work of the Holy Spirit. It is certainly true that the contentment we find in contemplating God's greatness and goodness, and in carrying out his wishes and practising the virtues, is a blessing from God, and one of the greatest. But it is not always a blessing that needs renewed supernatural assistance, as many of these good people claim. [Then a page or more of reports of •visionaries who attracted public attention, some of them quite sensible in other ways; and of •sharp disagreements amongs their followers. Then:] It is indeed desirable that good people should agree with one another and should work in unison; nothing could contribute more to making the human race better and happier. But they must themselves be people of good will, i.e. people who do good and are reasonable and ready to learn. Whereas all too many of those who are called 'religious' nowadays are accused of being dour and arrogant and unyielding. Their disputes show, at the least, that their inner witness needs outer verification if it is to be believed; they oughtn't to be accepted as inspired prophets until they have worked some miracles. Still, such inspired utterances could bring their evidence with them; this would be the case if they truly enlightened the mind through the important revelation of some surprising truth that the person in question couldn't

possibly have discovered without help from outside. [He gives examples of ‘prophets’ who have tried to authenticate their revelations by miracles, usually suspect ones. Then:] Still, such beliefs do sometimes have good results and lead to great things, for God can make use of error to establish and preserve the truth. But I don’t think we are entitled glibly to employ pious frauds for good purposes. And as for the dogmas of religion, we have no need for new revelations: if we

are presented with rules that are conducive to salvation we’re bound to obey them, even if the person who presents them doesn’t perform any miracles. And although Jesus Christ had the power to perform miracles, he sometimes refused to exercise it for the gratification of ‘this evil generation’ who ‘seek a sign’, when he was preaching only •virtue and •what had already been taught by natural reason and the prophets.

Chapter xx: Error

Philaethes: 1 Having said enough about our ways of knowing or guessing the truth, let us now say something about our errors and wrong judgments. (Men must often be in error, since they disagree with one another so much!) The reasons for error all come down to these four:

- Lack of proofs.
- Lack of ability to use proofs.
- Lack of desire to use proofs.
- Wrong measures of probability.

[Reminder: Here ‘proof’ means ‘evidence’ or ‘rational reasons for belief’. It is much weaker than ‘demonstration’ or ‘knock-down rigorously logically valid argument’.] 2 When I speak of ‘lack of proofs’, I am talking about •a lack not only of proofs that somebody has assembled but• also of the ones that *could* be had if we had the requisite means and opportunity—which in most cases we don’t. They are lacking for men whose lives are spent earning a living. Such men are no more informed about what goes on in the world than a packhorse that is driven constantly on the same road can be skilled in the geography

of the country. •To be decently informed• they would need languages, reading, conversation, observations of nature, and experience of the practical arts. 3 Since none of that is suitable to their position in life, shall we then say that the bulk of mankind has no guide except blind chance to lead them to their happiness or •away from• misery? Must they give themselves over to the •current opinions and •licensed guides of the country •they live in•, even with regard to everlasting happiness or unhappiness? If so, doesn’t that imply that someone might be eternally unhappy because he was born in one country rather than another? I have to admit, though, that no man is so completely taken up with earning a living that he has no spare time *at all* to think of his soul, and to inform himself in matters of religion—if he cared about this as much as he cares about less important matters.

Theophilus: Let us take it that men aren’t always in a position to instruct themselves, and that since they can’t

prudently give up providing for their families in order to search after elusive truths, they are compelled to abide by the views that are given authority in their societies. Still, we ought to judge that, in those who have the true religion without having proofs of it, •inward grace will be making up for the absence of •rational grounds for belief. And charity leads us to judge further, as I have already remarked to you, when good people are brought up among the deep shadows of the most dangerous errors, God will do for them everything that his goodness and justice require, even though we may not know how. . . . He can save souls by the inward working of the Holy Spirit, with no need of any great miracle. What is so good and comforting for mankind is the fact that to be in the state of God's grace one needs only to have, sincerely and seriously, a good will. I accept that this good will itself comes through the grace of God, in that *every* good—natural or supernatural—comes from him; but, still, it's enough to know this: all one needs •for salvation• is such a will, and God couldn't possibly have set an easier or more reasonable condition.

Phil: 5 There are people who •don't have the skill to make use of the evidences that they have—right at hand, so to speak—and who •can't carry a long train of consequences, or •weigh all the circumstances. There are men who can manage only one syllogism, others who can manage only two. This isn't the place to decide whether this limitation arises from natural differences in the souls themselves or in the organs, or whether it comes from the person's not having *used* his intellectual abilities sufficiently. All that matters here is that people do visibly differ in this respect, and that one has only to go from Parliament or the Stock Exchange to the lunatic asylum or the shelters for the homeless in order to be aware of it.

Theo: It is not only the poor who are in need. Some rich people lack more than the poor do, because they *want* too much and thus voluntarily put themselves into a kind of poverty that stops them from giving their attention to important matters. Example is very important here. People carefully follow the example of their peers, and •if they want to be socially successful• they have to do this without seeming reluctant, and this easily leads to their becoming *like* their peers. It's very hard to satisfy reason and custom both at once! As for those who lack •basic intellectual• ability: there may be fewer of these than you think, for I believe that good sense together with diligence can achieve any task for which speed is not required. I stipulate good sense because I don't think you would require the inmates of the lunatic asylum to engage in the pursuit of truth. The fact is that most of *them* could recover, if only we knew how to bring this about. Whatever inherent differences there are between our souls (and I believe there are indeed some), there is no doubt that any soul could achieve as much as any other, though perhaps not so quickly, if it were given proper guidance.

Phil: 6 There is another sort of person whose only lack is in their *will*. Their hot pursuit of pleasure, or constant drudgery in the making of money, or laziness and negligence in general, or a particular dislike for study and meditation, keep them from any serious thoughts about the truth. There are even some who fear that a really impartial inquiry wouldn't favour the opinions that best suit their prejudices and plans. We know some men won't read a letter that they think brings bad news; and many men abstain from doing their accounts or inquiring into the state of their affairs, for fear of learning something that they would prefer to go on not knowing. There are some who have great incomes that they spend wholly on provisions for the body, without thinking about

how to improve their understandings. They take great care to appear always in a neat and splendid outside, yet contentedly allow their minds to be dressed in miserable rags of prejudice and error, and allow their nakedness—i.e. their ignorance—to show through. Apart from the concern they ought to have with their state in the after-life, they are just as neglectful of the things they need to know for their life in *this* world. It's a strange thing that very often those who believe that their birth or fortune entitles them to have power and authority carelessly abandon power and authority to others whose condition is lower than theirs but who surpass them in knowledge. For those who are blind must be led by those who see, or else fall into the ditch. And there is no worse slavery than slavery of the understanding.

Theo: Health is one of our greatest blessings, yet people don't take trouble to know and do what would be conducive to health—striking evidence of their carelessness about their real interests! And this applies to those at the top of the heap as well as to those lower down, though they are all equally affected by threats to health. As for matters regarding the faith: some people look on the sort of thought that might bring them to an examination of *that* as a temptation of the Devil that is best overcome by turning the mind to something quite different. . . . One wishes that the men who have •power had •knowledge in proportion: even if it didn't include knowledge of the sciences, the practical arts, history, and languages, it might suffice if they had sound, practised judgment and knowledge of broad and general matters—i.e. the most important points. . . .

Phil: 7 Finally, most of our errors come from our wrongly estimating probabilities—suspending judgment on a proposition that there are obvious reasons to accept, or accepting a proposition in the face of contrary probabilities. These wrong

estimates come from:

- (1) treating doubtful propositions as though they were principles,
- (2) generally accepted hypotheses,
- (3) predominant passions or inclinations, and
- (4) authority.

8 ·I shall discuss these in order·. (1) We usually judge whether something is true on the basis of how it fits with what we look on as unchallengeable principles; and that leads us to dismiss the testimony of others, and even that of our senses, when they appear to be contrary to those principles. But before putting such confident trust in the latter, we should examine them with the utmost strictness. 9 Children have propositions insinuated into them by their father and mother, nurses, tutors, and others around them; and once these propositions have taken root they are treated as a sacred oracle set up in their minds by God himself. 10 Anything that offends against these internal oracles can hardly be tolerated, whereas the greatest absurdities that fit with them are swallowed whole. This shows up in how *obstinately* different men hold to quite contrary opinions as though they were articles of faith, though in many cases they are equally absurd. [He winds up with a jibe at what he takes to be the evangelical Christian view of the Eucharist, which he says implies 'that a single thing is at once flesh and bread'. Theophilus sharply says that this misrepresents the evangelicals, and then goes into much detail about the finer points of doctrine surrounding the Eucharist and the various sects' different views about them. Philalethes apologizes for having mis-spoken, and then continues:] 11 But let us move on from established principles to (2) generally accepted hypotheses. People who know that these are only *hypotheses* nevertheless often defend them fervently, almost like assured principles, and play down the contrary probabilities. It would

be intolerable to a learned professor to have his authority instantly overturned by an upstart innovator who rejected his hypotheses—his authority of thirty or forty years standing, acquired at great expense of time, supported by much Greek and Latin, and confirmed by general tradition and a reverend beard! Using *arguments* to convince him of the falsity of his hypothesis would be like the wind trying to get the traveller to part with his cloak, and having the effect of making him hold onto his cloak ever more tightly.

Theo: Indeed, the Copernicans have learned from their experience of their opponents that hypotheses that are recognized as such are still upheld with ardent zeal. And Cartesians are as emphatic in defence of their ‘striated particles’ and ‘little spheres of the second element’ as if they were theorems of Euclid. Our zeal in defence of our hypotheses seems to be merely a result of our passionate desire for personal respect. It is true that those who condemned Galileo believed that the earth’s state of rest was more than an hypothesis, for they held it to be in conformity with Scripture and with reason. But since then people have become aware that reason, at least, no longer supports it; and as for Scripture, Father Fabri. . . .took this matter up in the course of one of his writings, where he said openly that the understanding of the sacred text as referring to a true movement of the sun was only a provisional one, and that if Copernicus’s view came to be verified there would be no objection to expounding the passage in the same way as we do Virgil’s ‘The lands and the cities recede’ as one sails out to sea. Yet they still go on suppressing the Copernican doctrine in Italy and Spain, and even in the hereditary domains of the Emperor. This is greatly to the discredit of those nations: if only they had a reasonable amount of freedom in philosophizing, their minds could be raised to the most splendid discoveries.

Phil: 12 It does appear, as you say, that **(3)** prevailing passions are indeed the source of men’s love of hypotheses; but passions extend much further than that. The greatest probability in the world will be powerless to make a greedy or ambitious man see that he is unjust; and nothing could be easier than for a lover to let himself be deceived by his mistress. . . . We have two ways of evading the most apparent probabilities when they threaten our passions and prejudices. **13** The first is to think that there may be a fallacy hidden in the argument that is brought against us. **14** The second is to suppose that we could advance equally good or even better arguments to defeat our opponent if we had the opportunity or the cleverness or the help that would be needed to find them. **15** These ways of holding off belief are sometimes sound; but it’s illegitimate to use them in a case where •the issue has been set out quite clearly and •everything has been taken account of; for once *that* is done, there are ways of determining which side has the greater over-all probability. Thus, there are no grounds for doubting that

animals were formed through motions guided •by a thinking being rather than •through a chance coming together of atoms.

Just as no-one has the slightest doubt that

the printers’ letters that make an intelligible discourse have been put together •by human care rather than •by random jumbling.

I don’t think that we are free to withhold our assent over matters like those; but we can do so when the probability is less clear, and we can settle for the less well supported proposition if it suits our inclination better. [That last clause threatens to conflict with the next sentence. The clause misrepresents Locke, who wrote that a man can ‘content himself with the proofs he has, if they favour the opinion that suits his inclination or interest, and so stop further search’.] But it seems to me that a man can’t lean

to the side that seems to him to be the less probable, because **16** perception, knowledge and assent are not freely chosen; just as it isn't open to me to see or not see the agreement of two ideas when my mind is directed towards them. Yet we can voluntarily *stop investigating*; if we couldn't, ignorance and error could never be our fault. That is where we exercise our freedom. In cases where one's interests aren't involved, indeed, one accepts the common opinion, or that of the first comer. But in matters that concern our happiness or unhappiness, the mind sets itself more seriously to weigh the probability: I believe that then, i.e. when we are attending, we aren't free to *choose* which side to take, if there are obvious differences between the two. The greater probability, I think, will determine the assent.

Theo: Fundamentally I share your view; and we have already said enough about this when we treated of freedom in our earlier discussions. I showed then that •what we believe is never just •what we want to believe but rather •what we see as most likely; and that nevertheless we can bring it about *indirectly* that we believe what we want to believe. We can do this by turning our attention away from a disagreeable object so as to apply ourselves to something else that we find pleasing; so that by thinking further about the reasons for the side that we favour, we end up by believing it to be the most likely. As for opinions that we hardly care about at all, and that we embrace for feeble reasons: that happens because when an opinion has been put to us in a favourable light and we can see almost nothing against it, we find it superior to the opposing view, which has no support that we can see, by at least as much as if there were many reasons on both sides; for the difference between 0 and 1, or between 2 and 3, is just as great as that between 9 and 10. We are aware of that superiority, and we give no thought to—and

aren't encouraged to engage in—the kind of scrutiny that would be needed for a sound judgment to be made.

Phil: 17 The last wrong way of estimating of probability that I shall take notice of is **(4)** misunderstood authority, which keeps more people in ignorance or error than all the others put together. We see ever so many men who have no basis for their belief except the opinions that are accepted among their friends or the members of their profession, or within their party or their country. They seem to think: 'This doctrine has had the approval of reverend antiquity, it comes to me with the passport of earlier centuries, other men accept it, so I don't run any risk of error in accepting it myself.' Getting one's opinions in that sort of way is as bad as getting them by flipping a coin! Apart from the fact that all men are liable to error, I think that if we could only see the secret motives that influenced the men of learning and the leaders of parties we'd often find something quite different from the sheer love of truth. Anyway, there is no opinion so absurd that it couldn't be arrived at in this way, because there is almost no error that hasn't had its supporters.

Theo: It must be admitted, though, that in many cases one can't help yielding to authority. St Augustine wrote a rather good book, *On the Usefulness of Belief*, which is worth reading on this subject. As for received opinions: they have in their favour something close to what creates a 'presumption', as the legal theorists call it [see page 237]; and although one isn't obliged always to adopt them without proof, neither is one permitted to destroy them in the minds of others unless one has proofs against them. The point is that it is wrong to alter anything without reason. In recent years there has been much controversy over *the argument from large numbers*—the large numbers of people holding a given view—but when that argument is applied to approval

of a reason rather than testimony to a fact, the most that can be secured through it is something tantamount to what I have just been saying. Just as a hundred horses run no faster than one, although they can haul a greater load, so with a hundred men as compared with a single man: they can't walk any straighter, but they will work more effectively; they can't judge better, but they will be able to provide more of the materials on which judgment may be exercised. That is the meaning of the proverb *Two eyes see more than one*. This can be observed in assemblies, where vast numbers of considerations are presented that one or two people might never have thought of; though there is often a risk that the best decision won't be reached through these considerations, because no competent people have been given the task of thinking them over and weighing them up. That is why some judicious theologians of the Roman sect, seeing that the authority of the Church—i.e. of its highest-ranking dignitaries, and those with the most popular support—couldn't be infallible in matters concerned with reasoning, have restricted it to the mere certification of facts under the name of tradition. . . . In a book that was that was approved by the theologians of his order the learned Bavarian Jesuit Gretser expressed the opinion that the Church, relying on the promised aid of the Holy Spirit, can pass judgment on controversial matters by developing new articles of faith. Mostly they try to disguise this view, especially in France, claiming that the Church merely clarifies doctrines that are already established. But the clarification is either a pronouncement that is accepted already or a new one that is believed to be derived from accepted doctrine: the former case seldom occurs in practice, and as for the latter—the establishment of some new pronouncement—what can that be but a new article of faith? However, I don't favour contempt towards antiquity in religious matters. And I'm

even inclined to think that God has until now protected the councils of the whole Church from any error that is contrary to saving doctrine. But what a strange thing sectarian prejudice is! I have seen people ardently embrace an opinion merely because it is accepted in their order, or even just because it conflicts with the opinions of someone whose religion or nationality they dislike, even though the question has almost nothing to do with religion or with national interests. They may not have known that their zeal really arose from that source; but I have noticed that on first hearing that a certain person has written such and such a thing, they have rummaged through libraries and boiled up their animal spirits in the search for something with which to refute him. The same thing is often done, too, by people defending theses in universities and trying to shine against their adversaries. But what are we to say of the doctrines that are laid down in the symbolic books of the various sects, even among the Protestants, which people are often obliged to accept on their oath? . . . There is a distinction between teaching a view and accepting it: no oath in the world, and no prohibition, can compel a man to stay with an opinion, because beliefs are inherently involuntary; but he can and should abstain from *teaching* a doctrine that is thought to be dangerous, unless he finds that his conscience compels him to it. And in the latter case he should, if he is an appointed teacher, frankly declare where he stands and resign from his post—provided he can do so without putting himself into great danger, for that might compel him to leave quietly. That seems to be almost the only way of reconciling •the rights of society with •the rights of the individual, where society has to prevent something it judges to be bad, while the individual can't excuse himself from the duties laid on him by his conscience. . . .

Chapter xxi: The classification of the sciences

Philaethes: Here we are at the end of our journey, with all the operations of the understanding made clear. We aren't planning to explore the detail of what we know; but still it may be appropriate, before we finish, to look it over in a general way by considering the divisions of the sciences. **1** Everything that can come within the range of human understanding is either •the nature of things in themselves, •man considered as an agent who is inclined towards goals, especially his happiness, or •the means whereby knowledge is gained and communicated. So there you have science divided into three sorts. **2** The first is *physica* or natural philosophy [here = 'philosophy and science'], which takes in not only

bodies and their numbers, shapes etc.

but also

spirits, God himself, and the angels.

3 The second is practical philosophy, or ethics, which teaches how to attain things that are good and useful, aiming not only at knowledge of the truth but also at doing what is right. **4** The third is logic or the doctrine of signs (*logos* is Greek meaning 'word'). To communicate our thoughts to one another, as well as record them for our own use, signs of our ideas are necessary. If we paid *really* careful attention to this third kind of science that turns on ideas and words, perhaps we might get a kind of logic and system of criticism different from what we have known up to now. **5** And these three sorts—natural philosophy, ethics, and logic—are the three great provinces of the intellectual world, wholly separate and distinct one from another.

Theophilus: That division was a famous one even among the ancients. Like you, they took logic to include everything

having to do with words and with making our thoughts known—the art of speaking. But there is a problem about this, namely that

the science of reasoning, of judgment and of discovery appears to be quite different from

the knowledge of etymologies and language-use—knowledge that is neither determinate nor principled. Furthermore, one can't •explain words without •getting into the sciences themselves, as you can see from dictionaries; and conversely you can't •present a science without at the same time •defining its terms. But the chief problem about that division of the sciences is that each of the branches appears to swallow the others. Firstly, •ethics and •logic fall under •natural philosophy when that is taken as broadly as you have just done. For in treating of spirits, i.e. substances with understanding and will, and giving a thorough account of their understanding, you will bring in •the whole of logic; and if your doctrine about these spirits includes an account of matters pertaining to the will, you will have to talk about good and evil, happiness and misery, and it's entirely up to you whether you develop that topic far enough to bring in •the whole of practical philosophy. On the other hand, *everything* is relevant to our happiness, and so could be included within practical philosophy. As you know, theology is rightly regarded as a practical science; and jurisprudence and medicine are just as practical. So that the study of human happiness or of our well- and ill-being, if it deals adequately with all the ways of reaching the goal that reason sets before itself, will take in everything we know. . . . And the study of languages, which you and the ancients take to belong to logic, i.e. to what is deductive, will in turn annex

the territories of the other two—by treating every topic in alphabetically arranged dictionaries. So there are your three great provinces of the realm of knowledge, perpetually at war with one another because each of them keeps encroaching on the rights of the others! The nominalists thought there are as many particular sciences as there are truths, with the truths falling into groups only in so far as someone has organized them in that way. Others compare the totality of our knowledge with an uninterrupted ocean that is divided into the North Sea, the Atlantic Ocean, the Indian Ocean and the Red Sea only by arbitrary lines. A single truth can usually be put in different places, according to the various terms it contains. [He goes on at some length, with examples, about how a particular fact or event may be classified in several different ways, none of them incorrect. Then:] But now let us speak only of general doctrines, setting aside particular facts, history, and languages. I know of two main ways of organizing the totality of doctrinal truths. Each has its merits, and is worth bringing in. [We are about to encounter the terms ‘analytic’ and ‘synthetic’ with senses that were standard in Leibniz’s but are aren’t today. They label two ways of *presenting* scientific or philosophical results. Synthetic: start with what is most •general and basic, and then work down to more specific truths that are derived from and thus explained by the ones you started from. Analytic: mode you start with what is most •familiar, and work upwards from there to more general truths that explain the ones you started from.] **(1)** One is synthetic and theoretical: it involves setting out truths according to the order in which they are proved, as the mathematicians do, so that each proposition comes after those on which it depends. **(2)** The other arrangement is analytic and practical: it starts with the goal of mankind, namely with the goods whose sum total is happiness, and conducts an orderly search for means that will achieve those goods and avoid the corresponding evils. These two methods

are applicable to the realm of knowledge in general, and some people have also used them within particular sciences. Even geometry, which Euclid treated synthetically as a science, has been treated by others as an art, .i.e. a system of techniques; but even as an art it could still be handled demonstratively, and that would even show how the art is discovered. . . . If we were writing an encyclopedic account of the whole of knowledge, employing both methods at once, we could use a system of references so as to avoid repetition. **(3)** To these two kinds of arrangement we must add a third. It is classification by terms, and really all it produces is a kind of inventory. The inventory could be systematic, with the terms being ordered according to certain categories that are independent of all languages, or it could have an alphabetical order within the accepted language of the learned world. This inventory is needed if one is to assemble all the propositions in which a given term occurs in a significant enough way. For in the other two procedures, where truths are set out according to **(1)** their origins or according to **(2)** their use, the truths that concern some one term can’t all occur together. For example, when Euclid was explaining how to bisect an angle, it wouldn’t have been permissible for him to go straight on with the method for trisecting angles, because that would have required reference to conic sections, which couldn’t be taken account of at that stage in the work. But the inventory could and should indicate the locations of the important propositions concerning a given subject. We still have no such inventory for geometry. It would be a very useful thing to have, and could even be a help to discovery and to the growth of that science, for it would relieve the memory and would often save us the trouble of searching out anew something that has already been completely found. And there is even more reason why these inventories should be useful in the other sciences, where

the art of reasoning has less power, and they are utterly necessary in medicine above all. It would require a good deal of skill to construct them. Well, now, it strikes me as curious that •these three kinds of arrangement correspond to the ancient division, revived by you, which divides science or philosophy into theoretical, practical and deductive, or into natural philosophy, ethics and logic. The •synthetic arrangement corresponds to the •theoretical, the •analytic to the •practical, and the •one with an inventory according to terms corresponds to •logic. So the ancient division serves very well, just so long as it is understood in the same way as the above three arrangements on the account I have just given of them—namely, not as distinct sciences but rather as different ways in which one can organize the same truths, if one sees fit to express them more than once. There is also an administrative way of dividing the sciences, according to the faculties of universities and the professions. This is used in the universities and in organizing libraries. . . . The accepted administrative division, according to the four faculties—Theology, Jurisprudence, Medicine and Philosophy—deserves respect. •Theology treats of eternal happiness, and of everything that bears on that in so far as it depends on the soul and the conscience. It is a sort of jurisprudence that has to do with the matters that are said to concern the ‘inner tribunal’ of conscience, and that brings in invisible substances and minds. •Jurisprudence is concerned with government and with laws, whose goal is the happiness of men in so far as it can be furthered by what is outer and sensible. Its chief concern, though, is only with matters that depend on the nature of the mind, and it doesn’t go far into the detail of corporeal things, taking their nature for granted in order to use them as means. This at once relieves it of one large matter, namely the health, strength and improvement of the human body—the care of

that being assigned to the faculty of •Medicine. Some people have believed, not without reason, that along with the others there should be an *Economic* faculty: this would include the mathematical and mechanical arts, and everything having to do with the fine points of human survival and the conveniences of life; and it would include agriculture and architecture. But the faculty of •Philosophy is left to pick up everything that isn’t contained in the three faculties that are deemed to be superior. That wasn’t a very good thing to do, for it has left those in this fourth faculty with no way of improving their skills by exercising them, as can those who teach in the other faculties. And so the faculty of Philosophy, except perhaps for mathematics, is regarded as merely an introduction to the others. That’s why it is expected to teach young people history and the arts of speaking, and also to teach—under the titles of metaphysics or pneumatology [= ‘psychology’], ethics and politics—some of the rudiments of natural theology and jurisprudence, which are independent of divine and human laws; with a little natural science as well, for the benefit of the young physicians. There, then, is the administrative division of the sciences, in accordance with the professional bodies of learned men who teach them. And then there are the professions whose members serve society other than by what they say, and who ought to be guided by those who are truly learned—if only learning were valued as it ought to be! Even in the higher manual arts there has been an alliance of practice with learning, and it could go further. As indeed they *are* allied in medicine, not only in ancient times when physicians were also surgeons and apothecaries, but even today, especially among the chemists. This alliance between practice and theory can also be seen in war, and among those who teach manoeuvres, among painters, sculptors and musicians, and among certain other kinds of virtuosi. If the principles of all these professions,

arts and even trades were taught in a practical way by the philosophers—or it might be in some other faculty of learned men—the latter would truly be the teachers of mankind. But this would require many changes in the present state of things in literature, in the education of the young, and thus in public policies. When I reflect on how greatly human

knowledge has increased in the past century or two, and how easy it would be for men to go incomparably further along the road to happiness, I'm not in despair of the achievement of considerable improvements, in a more peaceful time under some great monarch whom God may raise up for the good of mankind.