

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 sun's 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 occa-

sionally 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, with-

out 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 natu-

ral 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, with-

out 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 co-existence 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 wonder-

ful 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 169]), 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 con-

jecture 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

Philethes 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, Philalethes 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

Philalethes: 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.xxxii]; 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 $gold_1$ was still rare while $gold_2$ was common, and that we saw fit to restrict the name ‘true gold’ to the rare species $gold_1$ so as to set it aside—with the aid of new tests that would distinguish it from $gold_2$ —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 204.] 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.