

The Principles of Human Knowledge

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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.

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Contents

Introduction	1
Sections 1–50	11
Sections 51–99	25
Sections 100–156	39

Sections 100–156

100. Everyone may think he knows what it is for a man to be *happy*, or an object to be *good*. But few people can claim to make an abstract idea of happiness separated from all particular pleasures, or of *goodness* separated from everything that is good. Similarly a man may be just and virtuous without having precise ideas of justice and virtue. The opinion that words like those stand for general notions, abstracted from all particular persons and actions, seems to have made morality difficult, and the study of it less useful to mankind. And in effect the doctrine of abstraction has contributed greatly towards spoiling the most useful parts of knowledge.

101. Natural science and mathematics are the two great provinces of speculative [= not practical, not moral] science that have to do with ideas received from the senses; and I shall make some remarks about each of these, starting with the former. This discussion will run up to the end of **117**, after which I shall turn to mathematics. It is with natural science that the sceptics seem to triumph: the great stock of arguments they produce, to belittle our faculties and make mankind appear ignorant and low, are drawn principally from the premise that we are incurably blind as to the true and real nature of things. They exaggerate this, and love to enlarge on it. We are miserably made fools of, they say, by our senses, and fobbed off with the outside, the mere appearance, of things. The real essence—the internal qualities and constitution of every little object—is hidden from our view; every drop of water, every grain of sand, contains something that it is beyond the power of human understanding to fathom or comprehend. But it is evident from what I have shown that this complaint is wholly groundless, and that false principles are making us mistrust our senses to such

an extent that we think we know nothing of things that in fact we comprehend perfectly.

102. One great inducement to our pronouncing ourselves ignorant of the nature of things is the opinion—which is popular these days—that every thing contains within itself the cause of its own properties: or in other words that there is in each object an inner *essence* that is the source from which its perceptible qualities flow and on which they depend. Some have claimed to account for appearances by an essence consisting of secret and mysterious qualities, but recently they are mostly explained in terms of mechanical causes, that is, the shape, motion, weight, etc. of imperceptible particles. But really the only agent or cause is *spirit*, because obviously motion and all the other ideas are perfectly inert. See **25**. Hence, to try to explain the production of colours or sounds by shape, motion, size etc. has to be wasted labour. That's why attempts of that kind can always be seen to be unsatisfactory. (The same can be said in general, of any 'explanation' that assigns one idea or quality as the *cause* of another.) I needn't say how many hypotheses and speculations we are spared by my doctrine, and how much simpler it makes the study of nature.

103. The great mechanical principle that is now in vogue is *attraction*, which seems to some people to provide a good enough explanation of a stone's falling to the earth, or the sea's swelling towards the moon. But how are we enlightened by being told this is done *by attraction*? Is it that this word signifies the kind of tendency that is involved, telling us that the event comes from bodies' pulling one another, rather than from their being pushed towards each other? But that tells us nothing about how this 'pulling' is done. For all we know to the contrary, it could as well be called *pushing* as *pulling*. Again, we see the parts of steel hold

firmly together, and this also is accounted for by attraction; but here as in the other examples I can't see that this does more than merely to describe the effect. As for *how* the effect is produced, or *what* the cause is that produces it, the 'explanation' in terms of attraction doesn't even try to tell us that.

104. It is true that if we consider a number of phenomena together, and compare them, we may observe some likeness and conformity amongst them. For example, in •the falling of a stone to the ground, in •the rising of the sea towards the moon, and in •cohesion and crystallization, there is a similarity because each involves bodies' combining or approaching one another. So any phenomenon of that sort may not seem strange or surprising to a man who has accurately observed and compared the effects of nature. When we find an event strange or surprising, it is always something that is uncommon, a thing by itself, out of the ordinary course of our observation. We don't find it strange that bodies tend towards the centre of the earth, because that is what we perceive every moment of our lives. But bodies' having a similar gravitation towards the centre of the moon may seem odd and unaccountable to most men, because we see it only in the tides. But •things are different with• a scientist, whose thoughts take in a larger extent of nature. He observes that certain events in the heavens bear some likeness to ones on the earth, indicating that innumerable bodies tend to move towards each other, and he gives this tendency the general name 'attraction', and thinks he has explained anything that can be shown to be an instance of it. Thus he explains the tides by the *attraction* of our earth-and-water globe towards the moon; he doesn't find that odd or anomalous, but sees it as only a particular example of a general rule or law of nature.

105. So if we consider how natural scientists differ from other men in respect of their knowledge of phenomena, we shall find that the difference consists, not in •a more exact knowledge of the causes that produce phenomena (for that can only be the will of a spirit), but rather in •a greater breadth of comprehension. Through this—that is, through the *amount* of data they take account of—scientists can discover analogies, harmonies, and agreements among the works of nature, and can explain particular effects. Such 'explaining' consists in bringing events under general rules (see **62**) that are based on the analogy and uniformness observed in the production of natural effects. We like such rules, and try to find them, because they extend our view beyond what is •temporally• present and •spatially• near to us, and enable us to make very probable conjectures about things that may have happened at very great distances of time and place, as well as to predict things to come. This sort of striving towards omniscience is something that the mind likes greatly.

106. But we should proceed cautiously in matters like this, for we are apt to lay too great a stress on analogies, and—at the expense of truth—to indulge the mind in its eagerness to extend its knowledge into general theorems. For example, *gravitation*, or mutual attraction, appears in many instances; and this leads some people to rush into calling it universal, maintaining that *attracting and being attracted by every other body* is an essential quality inherent in all bodies whatsoever. Whereas it appears that the fixed stars have no such tendency to move towards each other; and gravitation is so far from being essential to bodies that in some instances a quite contrary principle seems to show itself; as in the upward growth of plants, and the elasticity of the air. There is nothing necessary or essential about any of this; it depends entirely on the will of the *governing spirit*,

who causes certain bodies to stick together or tend towards each other, according to various laws, while he keeps others at a fixed distance; and to some he gives a quite contrary tendency to fly apart, just as he sees convenient.

107. After what I have said, I think we may lay down the following conclusions. First, it is clear that philosophers give themselves needless trouble when they look for any natural cause other than a mind or spirit. Secondly, considering that the whole creation is the work of a wise and good agent, scientists should think it fitting to employ their thoughts (contrary to what some hold) about the *purposes* of things; and I must confess that I see no reason why pointing out the various ends to which natural things are adapted, and for which they were originally with great wisdom contrived, should not be thought to be one good way of accounting for them, and altogether worthy of a scientist. Thirdly, what I have said provides no reason why men shouldn't study how things go in the world, making observations and experiments. That these are useful to us, enabling us to draw general conclusions, results not from •any unchangeable properties of, or relations between, things themselves, but only from •God's goodness and kindness to men in his management of the world. See **30–31**. Fourthly, by diligently observing the phenomena within our view, we can discover the general laws of nature, and from them *deduce* further phenomena. I don't say *demonstrate* [= 'prove in a rigorously valid manner']; for all deductions of this kind depend on supposing that the author of nature always operates uniformly, constantly keeping to those rules that we regard as principles—though we can't know for sure that they are.

108. Those men who make general rules from phenomena, and afterwards derive phenomena from those rules, seem to be considering *signs* rather than *causes*. A man may

understand natural signs well without being able to say by what rule a one event is a sign of another. And just as it is possible to write improperly through too strictly observing general rules of grammar, so also in arguing from general rules of nature we may extend the analogy too far and thus run into mistakes.

109. In reading ordinary books a wise man will choose to fix his thoughts on the meaning of what he reads, and on its application to his life, rather than bringing to mind grammatical remarks on the language. Similarly in reading the book of nature, it seems beneath the dignity of the mind to make a show of exactness in bringing each particular phenomenon under general rules, or showing how it follows from them. We should aim at nobler views, ones that •will relax and elevate the mind with a prospect of the beauty, order, extent, and variety of natural things; then •enable us by proper inferences from them to enlarge our notions of the grandeur, wisdom, and kindness of the creator; and lastly •bring us to do our best to make the various parts of the creation subservient to the ends they were designed for—namely, God's glory and the life and comfort of ourselves and our fellow-creatures.

110. The best key to natural science is widely agreed to be a certain celebrated treatise of mechanics—Newton's *Principia*. At the start of that justly admired treatise, time, space, and motion are each distinguished into

absolute and *relative*,

•or, giving the same distinction in different words•,

true and *apparent*,

or •in yet other words•

mathematical and *vulgar* [= 'that of the plain uneducated ordinary person'].

According to the author's extensive account of it, this distinction does presuppose that time, space and motion exist

outside the mind, and that they are ordinarily •conceived as relating to perceptible things; but •really in their own nature they have no relation to them at all.

111. As for *time*, as it is taken •by Newton• in an absolute or abstracted sense, for the duration or continuance of the existence of things, I have nothing to add to what I said about this in **97–8**. For the rest, this celebrated author holds that there is an •absolute space which, not being perceivable by the senses, is the same everywhere and is immovable: and he takes •relative space to be the *measure* of absolute space, which being movable and defined by its situation in relation to perceptible bodies, is commonly taken to be immovable •or absolute• space. He defines *place* as the part of space that is occupied by some body. And according as the *space* is absolute or relative, so also is the *place*. *Absolute motion* is said to be the moving of a body from one absolute place to another, as *relative motion* is from one relative place to another. And because the parts of absolute space don't fall under our senses, instead of them we are obliged to use their perceptible measures, •namely parts of relative space•; and so we define both place and motion in relation to bodies that we regard as immovable. But, it is said •by Newton•, in scientific matters we must abstract from our senses, since it may be that none of those bodies that seem to be at rest are truly so: and a thing that is moved relatively may be really—that is, absolutely—at rest. Similarly, a single body may at one time be both in relative rest and in motion, or even be moving with contrary relative motions, according as its place is variously defined. All this indeterminacy is to be found in the apparent •or relative• motions, but not at all in the true or absolute ones, and so science should attend only to the latter. True motions, we are told •by Newton•, are distinguished from apparent or relative ones by the following •five• properties. •In true or absolute motion, anything that

keeps the same position in relation to a whole undergoes any motions that the whole undergoes. •When a place is moved, anything that is in the place is also moved: so that a body moving in a place that is in motion undergoes the motion of its place. •A body never starts to move or changes how it is moving unless a force acts on it. •A body's true motion is always changed when force acts on it. •In circular motion that is merely relative, there is no centrifugal force; but in true or absolute circular motion there is centrifugal force, which is proportional to the quantity of motion.

112. Despite all this, it doesn't appear to me that there can be any motion except relative motion. To conceive motion, •it seems to me•, one must conceive at least two bodies that alter in their distance from, or position in relation to, each other. Hence if there was one only body in existence, it couldn't possibly be moved. This seems obvious, because the idea that I have of *motion* necessarily includes *relation*.

113. But although in every motion one must conceive two or more bodies, it can happen that only one of them is moved, namely the one that is acted on by the force causing the change of distance. Someone might define relative motion in such a way that a body counts as moving if it changes its distance from some other body, even if the force or action causing that change is not applied to it. But •that would be a bad definition, and here is why•. Relative motion is something we perceived by our senses, something we have to do with in the ordinary affairs of life; so it seems that every man of common sense knows what it is, as well as the best scientist. Now, I ask anyone whether, in this sense of 'motion', the stones under his feet *move* as he walks along the street, because they change their distances from his feet? It seems to me that though motion includes a relation of one thing to another, it is not necessary that each of the related things be

said to move. As a man may think of something that doesn't think, so a body may be moved to or from another body that doesn't move.

114. As the *place* of a thing happens to be variously defined, so its *motion* varies. A man in a ship may be said to be motionless in relation to the sides of the vessel, and yet to move in relation to the land. Or he may move eastward in respect of the ship and westward in respect of the land. In the common affairs of life, men never go beyond the earth to define the place of any body, so that what is motionless in respect of the earth is thought of as absolutely motionless. But scientists, who have a greater extent of thought and more accurate notions of the system of things, have learned that even the earth itself moves. In order therefore to fix their notions, they seem to conceive the material universe as finite, and its unmoving outer walls or shell to be the place in terms of which they estimate 'true motions'. If we consult our own conceptions, I think we shall find that the only idea we can form of absolute motion is basically the idea of relative motion defined in that manner, .i.e. in terms of relations to the outermost shell of the universe. For, as I have already remarked, *absolute motion* without *external relation* is incomprehensible; and all the above-mentioned properties, causes, and effects ascribed to absolute motion will, I think, be found to fit with this .outer-shell. kind of relative motion. As to what is said .by Newton. about centrifugal force, namely that it doesn't at all belong to circular relative motion: I don't see how this follows from the experiment that is brought to prove it. [Berkeley here gives the reference to Newton's *Principia*.] For the water in the vessel, at the time at which it is said to have the greatest relative circular motion, really has no motion at all; as is plain from the foregoing section. .In the following section I defend this further.

115. A body doesn't count as *moving* unless **(1)** its distance from, or relation to, some other body alters, and **(2)** the force or action bringing about that alteration is applied to it .rather than to the other body. If either of these is lacking, I don't think that it conforms with how people in general think and speak to say that the body 'is in motion'. I grant indeed that when a body's distance from some other alters, we may *think* it is moving although no force is acting on it; but if we think this it is because we think of the body in question as having the relevant force applied to it. This shows only that we are capable of wrongly thinking a thing to be in motion when it is not.

116. From what has been said, it follows that the scientific consideration of motion doesn't imply the existence of an absolute space, distinct from the space that •is perceived by the senses, •is related to bodies, and •cannot exist outside the mind, as is clear from the principles that prove the same thing of all other objects of sense. If we look into it closely we shall perhaps find that we can't even form an idea of *pure space without bodies*. This, I must confess, seems impossible, as being a most abstract idea. When I cause a motion in some part of my body, if it is free or without resistance I say there is *space*; but if I find resistance, then I say there is *body*; and in proportion as the resistance to motion is lesser or greater, I say the space is more or less pure. So that when I speak of *pure or empty space*, don't think that the word 'space' stands for an idea that can be conceived without body and motion. (We are apt to think every noun stands for a distinct idea that can be separated from all others; and this has led to infinite mistakes.) Thus, when I say that if all the world were annihilated except for my own body, there would still remain 'pure space', all I mean is that I conceive it possible .in that eventuality. for the limbs of my body to be moved on all sides without the least resistance. If my

body were also annihilated, there could be no motion, and consequently no space. Some people may think that eyesight provides them with the idea of pure space; but it is plain from what I have shown elsewhere that the ideas of space and distance aren't obtained through sight. See the *New Theory of Vision*.

117. What I am saying here seems to put an end to all those disputes and difficulties that have sprung up amongst the learned concerning the nature of pure space. Its biggest benefit is to free us from that dangerous dilemma, in which some who have thought about this topic see themselves as trapped, namely: having to think either that •real space is God, or else that •there is something besides God that is •also• eternal, uncreated, infinite, indivisible, unchanging—each of which may fairly be thought pernicious and absurd. It is certain that a good many divines, as well as highly reputed philosophers, have thought that space must be divine, because they could not conceive its being limited or its being annihilated. And recently some •such as Spinoza• have undertaken to show that the attributes of God (which cannot be shared) are possessed by space. However unworthy of the divine nature this doctrine may seem, I don't see how we can avoid it if we adhere to the commonly accepted opinions.

118. Up to here I have written about natural science. Now let us enquire into that other great branch of speculative knowledge, namely mathematics. •See the start of 101•. Celebrated though it is for its clearness and certainty of demonstration, which is matched hardly anywhere else, mathematics cannot be supposed altogether free from mistakes if in its principles there lurks some secret error that mathematicians share with the rest of mankind. Mathematicians deduce their theorems from premises that are highly certain; but their first principles are confined to the concept of *quantity*; and

they don't ascend into any enquiry concerning those higher maxims that influence all the particular sciences •including ones that aren't quantitative•. Any errors involved in those •higher• maxims will infect every branch of knowledge, including mathematics. I don't deny that the principles laid down by mathematicians are true, or that their methods of deduction from those principles are clear and beyond dispute. But I hold •that there are certain erroneous maxims that spread wider than mathematics, and for that reason are not explicitly mentioned there, though they are tacitly assumed throughout the whole progress of that science; and •that the bad effects of those secret, unexamined errors are diffused through all the branches of mathematics. To be plain, I suspect that mathematicians as well as other men are caught in the errors arising from the doctrines of abstract general ideas and of the existence of objects outside the mind.

119. Arithmetic has been thought to have for its object abstract ideas of *number*. A considerable part of speculative knowledge is supposed to consist in understanding the properties and mutual relations of numbers. The belief in the pure and intellectual nature of *numbers in the abstract* has won for them the esteem of those thinkers who put on a show of having an uncommon subtlety and elevation of thought. It has put a price on the most trifling numerical theorems that are of no practical use and serve only to pass the time; and it has infected the minds of some people so much that they have dreamed of mighty mysteries involved in numbers, and tried to explain natural things by means of them. But if we look into our own thoughts, and consider the doctrines I have laid down, we may come to have a low opinion of those high flights and abstractions, and to look on all researches into numbers as mere earnest trivialities insofar as they aren't practically useful in improving our lives.

120. *Unity* in the abstract I have considered in **13**. From that discussion and from what I said in the Introduction, it plainly follows there is no such idea. But *number* being defined as a *collection of units*, we can conclude that if there is no such thing as *unity* or *unit* in the abstract, there are no ideas of *number* in the abstract denoted by names and numerals. Therefore, if theories in arithmetic are abstracted •from the names and numerals, and •also from all use and practical application as well as •from particular things that are numbered, *they have no subject matter at all*. This shows us how entirely the science of numbers is subordinate to practical application, and how empty and trifling it becomes when considered as a matter of mere theory.

121. There may be some people who, deluded by the empty show of discovering abstracted truths, waste their time on useless arithmetical theorems and problems. So it will be worthwhile to consider that pretence more fully, and expose its emptiness. We can do this clearly by looking first at arithmetic in its infancy, observing what originally set men going on the study of that science, and what scope they gave it. It is natural to think that at first men, for ease of memory and help in calculations, made use of counters, or in writing made use of single strokes, points, or the like, each of which was made to stand for *a unit*—that is, some one thing of whatever kind they were dealing with at that time. Afterwards they discovered the more compact ways of making one symbol stand in place of several strokes or points. For example, the Romans used V instead of five points, X instead of ten points, and so on. And lastly, the notation of the Arabians or Indians—the system using 1, 2, 3, etc.—came into use, in which, by the repetition of a few characters or figures, and varying the meaning of each figure according to its place in the whole expression, all numbers can be conveniently expressed. This seems to have been done in imitation of lan-

guage, so that the notation in numerals runs exactly parallel to the naming of numbers in words: the nine simple numerals correspond to the first nine names of numbers, and the position of a simple numeral in a longer one corresponds to the place of the corresponding word in a longer word-using name for a number. Thus, for example, ‘7’ corresponds to ‘seven’; and the significance of ‘7’ in ‘734’—namely, as standing for seven hundreds—corresponds to the significance of ‘seven’ in ‘seven hundred and thirty-four’. And agreeably to those rules about how a numeral’s value is determined by its place in the sequence, methods were contrived for working out what row of numerals is needed to name a given number, and what number is named by a given row of numerals. Having found the *numerals* one seeks, keeping to the same rule or parallelism throughout, one can easily read them into *words*; and so the number becomes perfectly known. For we say that the number of such-and-suches is known when we know the names or numerals (in their proper order) that belong to the such-and-suches according to the standard system. For when we know these signs, we can through the operations of arithmetic know the signs of any part of the particular sums signified by them; and by thus computing in signs (because of the connection established between them and the distinct numbers of things each of which is taken for a unit), we can correctly add up, divide, and proportion the things themselves that we intend to number.

122. In arithmetic therefore we have to do not with the *things* but with the *signs*, though these concern us not for their own sake but because they direct us how to act in relation to things, and how to manage them correctly. Just as I have remarked concerning language in general (**19 intro**), so here too abstract ideas are thought to be signified by numerals or number-words at times when they don’t suggest ideas of particular things to our minds. I shan’t go further into this

subject now, except to remark that what I have said shows clearly that the things that are taken to be abstract truths and theorems concerning numbers are really about nothing but •particular countable things—or about •names and numerals, which were first attended to only because they are signs that can aptly represent whatever •particular things men needed to calculate about. To study these •names or numerals• for their own sake, therefore, would be just as wise and pointful as to neglect the true use or original intention and purpose of language, and to spend one's time on irrelevant criticisms of words, or on purely verbal reasonings and controversies.

123. From *numbers* we move on to discuss *extension*, which (considered as relative) is the object of geometry. The infinite divisibility of finite extension, though it isn't explicitly asserted either as an axiom or as a theorem in the elements of geometry, is assumed throughout it, and is thought to have so inseparable and essential a connection with the principles and proofs in geometry that mathematicians never call it into question. This notion is the source of all those deceitful geometrical paradoxes that so directly contradict the plain common sense of mankind, and are found hard to swallow by anyone whose mind is not yet perverted by learning. It is also the principal source of all the fine-grained and exaggerated subtlety that makes the study of mathematics so difficult and tedious. So if I can make it appear that *nothing whose extent is finite contains innumerable parts, or is infinitely divisible*, that will immediately •free the science of geometry from a great number of difficulties and contradictions that have always been thought a reproach to human reason, and also •make the learning of geometry a much less lengthy and difficult business than it has been until now. •My discussion of infinite divisibility will run to the end of **132**•.

124. Every particular finite extension [= 'finitely extended thing'] that could possibly be the object of our thought is an idea existing only in the mind, and consequently each part of it must be perceived. If I cannot perceive innumerable parts in any finite extension that I consider, it is certain that they aren't contained in it: and it is evident that indeed I *cannot* distinguish innumerable parts in any particular line, surface, or solid that I either perceive by sense or picture to myself in my mind; and so I conclude that no such thing contains innumerable parts. Nothing can be more obvious to me than that the extended things I have in view are nothing but my own ideas, and it is equally obvious that I can't break any one of my ideas down into an infinite number of other ideas—which is to say that none of them is infinitely divisible. If 'finite extension' means something distinct from a finite idea, I declare that I don't know what it means, and so cannot affirm or deny anything regarding it. But if the terms 'extension', 'parts', and the like are given any meaning that we can conceive, that is, are taken to stand for ideas, then to say 'a finite quantity or extension consists of infinitely many parts' is so obvious a contradiction that everyone sees at a glance that it is so. And it could never gain the assent of any reasonable creature who is not brought to it by gentle and slow degrees, like bringing a converted pagan to believe that in the communion service the bread and wine are turned into the body and blood of Jesus Christ. Ancient and rooted prejudices do often turn into principles; and once a proposition has acquired the force and credit of a principle, it is given the privilege of being excused from all examination, as is anything deducible from it. There is no absurdity so gross that the mind of man can't be prepared in this way to swallow it!

125. Someone whose understanding is prejudiced by the doctrine of abstract general ideas may be persuaded that

extension in the abstract is infinitely divisible, whether or not the ideas of sense are. And someone who thinks the objects of sense exist outside the mind may be brought by *that* to think that a line an inch long may contain innumerable parts really existing, though they are too small to be discerned. These errors—abstract ideas, and existence outside the mind—are ingrained in geometers' minds as thoroughly as in other men's, and have a similar influence on their reasonings; and it wouldn't be hard to show how they serve as the basis for the arguments that are employed in geometry to support the infinite divisibility of extension. At present I shall only make some general remarks about why the mathematicians cling to this doctrine so fondly.

126. I have pointed out that the theorems and demonstrations of geometry are about *universal* ideas (**15 intro**). And I explained in what sense this ought to be understood, namely that the *particular* lines and figures included in the diagram are supposed to stand for innumerable others of different sizes. In other words, when the geometer thinks about them he *abstracts* from their size; this doesn't imply that he forms an abstract idea, only that he doesn't care what the particular size is, regarding that as irrelevant to the demonstration. Thus, an inch-long line in the diagram must be spoken of as though it contained ten thousand parts, since it is regarded not in its particular nature but as something universal, and it is universal only in its signification, through which it represents innumerable lines longer than it is, in which ten thousand parts or more may be distinguished, even though it is itself a mere inch in length. In this manner the properties of the *lines signified* are (by a very usual figure of speech) transferred to the *sign*, and from that are mistakenly thought to belong to the sign—the inch-long line—considered in its own nature.

127. Because there is no number of parts so great that there couldn't be a line containing more, the inch-line is said to contain parts more than any assignable number; which is not true of *the inch itself* but is true for *the things it signifies*. But men lose sight of that distinction, and slide into a belief that the small particular line drawn on paper has in itself innumerable parts. There is no such thing as the ten-thousandth part of •an inch; but there is a ten-thousandth part of •a mile or of •the diameter of the earth, which may be signified by that inch. When therefore I delineate a triangle on paper, and take one inch-long side (for example) to be the radius •of a circle•, I consider this as divided into ten thousand or a hundred thousand parts, or more. For though the ten-thousandth part of that line, considered in itself, is nothing at all, and consequently may be neglected without any error or inconvenience, yet these drawn lines are only marks standing for greater lengths of which a ten-thousandth part may be very considerable; and that is why, to prevent significant errors in practice, the radius must be taken to have ten thousand parts or more.

128. What I have said makes plain why, if a theorem is to become universal in its use, we have to speak of the lines drawn on the page as though they *did* have parts that really they *don't* have. When we speak in this way, if we think hard about what we are doing we'll discover that we cannot conceive an inch itself as consisting of (or being divisible into) a thousand parts, but only some other line that is far longer than an inch and is represented by it. And •we'll discover• that when we say that a line is infinitely divisible, we must mean a line that is infinitely long. The procedure I have described here seems to be the chief reason why the infinite divisibility of finite extension has been thought necessary for geometry.

129. The various absurdities and contradictions that flowed from this false principle might have been expected to count as so many arguments against it. But this didn't happen, because it is maintained—I know not by what logic—that propositions relating to infinity are not to be challenged on grounds of what follows from them. As though contradictory propositions could be reconciled with one another within an infinite mind! Or as though something absurd and inconsistent could have a necessary connection with truth, or flow from it! But whoever considers the weakness of this pretence will think that it was contrived on purpose to humour the laziness of the mind, which would rather slump into an indolent scepticism than take the trouble to carry through a severe examination of the principles it has always embraced as true.

130. Recently the theories about infinites have run so high and led to such strange notions that large worries and disputes have grown up among contemporary geometers. Some notable mathematicians, not content with holding that finite lines can be divided into an infinite number of parts, also maintain that each of those infinitesimals is itself subdivisible into an infinity of other parts, or infinitesimals of a second order, and so on ad infinitum. I repeat: these people assert that there are infinitesimals of infinitesimals of infinitesimals, without ever coming to an end! According to them, therefore, an inch does not merely contain an infinite number of parts, but an infinity of an infinity of an infinity . . . ad infinitum of parts. Others hold that all orders of infinitesimals below the first are nothing at all, because they reasonably think it absurd to imagine that there is any positive quantity or part of extension which though multiplied infinitely can never equal the smallest given extension. And yet on the other hand it seems no less absurd to think that the square-root, cube-root etc. of a genuine positive number should itself be

nothing at all; which they who hold infinitesimals of the first order, denying all of the subsequent orders, are obliged to maintain.

131. Doesn't this, then, give us reason to conclude that both parties are in the wrong, and that there are really no such things as infinitely small parts, or an infinite number of parts contained in any finite quantity? You may say that this will destroy the very foundations of geometry, and imply that those great men who have raised that science to such an astonishing height have all along been building a castle in the air. To this I reply that whatever is useful in geometry and promotes the benefit of human life still remains firm and unshaken on my principles. That science, considered as practical, will be helped rather than harmed by what I have said; though to show this clearly fully might require a separate book. For the rest, even if my doctrines imply that some of the more intricate and subtle parts of theoretical mathematics may be peeled off without prejudice to the truth, I don't see what damage this will bring to mankind. On the contrary, it is highly desirable that men of great abilities and tenacious minds should turn their thoughts away from those distractions and employ them in studying things that lie nearer to the concerns of life, or have a more direct influence on how we live.

132. It may be said that various undoubtedly true theorems have been discovered by methods in which infinitesimals were used, which couldn't have happened if their existence included a contradiction in it. I answer that when you look into this thoroughly you won't find any case where you *need* to conceive infinitesimal parts of finite lines, or even quantities smaller than the smallest you can perceive. You'll find that this is never done, because it is impossible. This completes my discussion of infinite divisibility.

133. What I have said makes it clear that very numerous and important errors have arisen from the false principles that I have criticized in the earlier parts of this work. And the opposites of those erroneous tenets seem to be very fruitful principles that have innumerable consequences that are highly advantageous to true philosophy as well as to religion. I have shown in detail that *matter*, or the absolute existence of corporeal objects, has always been the chief source of the strength and confidence of the most openly declared and pernicious enemies of all knowledge, human and divine. And, surely, if •by distinguishing the real existence of unthinking things from their being perceived, and allowing them a substance of their own out of the minds of spirits, no one thing is explained in nature, but on the contrary many inexplicable difficulties arise; if •the supposition of matter is shaky at best, because there is not so much as one single reason to support it; if •its consequences cannot survive the light of examination and free enquiry, but screen themselves under the dark and general claim that infinities can't be understood; if furthermore •the removal of this matter doesn't bring the slightest bad consequence, if it is not even missed in the world, but everything is conceived just as well—indeed better—without it; if, lastly, •both sceptics and atheists are forever silenced by the doctrine that there are only spirits and ideas, and this philosophy is perfectly agreeable both to reason and religion; we might expect that it—my philosophy—would be admitted and firmly embraced, even if it were offered only as an hypothesis, and the existence of matter were allowed as possible, which I have clearly shown that it isn't.

134. It is true that my principles reject as useless various disputes and speculations that are widely thought to be important parts of learning. But however great a prejudice against my notions this may give to those who have already

been deeply engaged in such speculations and made large advances in studies of that nature, I hope that *others* won't hold it against my principles and tenets that they shorten the labour of study, and make human sciences more clear, wide-ranging, and manageable than they were before!

135. Having completed what I planned to say about the knowledge of *ideas*, my next topic is *spirits*. We have more knowledge of these than we are commonly thought to have. We don't know the nature of spirits, people think, because we have no ideas of spirits. But I have shown in **27** that it is plainly impossible for there to be an idea of a spirit; so surely it oughtn't to be regarded as a defect in our understanding that it doesn't have any such idea. To the arguments of **27** I shall add one more. I have shown that a spirit is the only substance or support in which ideas can exist; and it is obviously absurd to suppose that this *support* of ideas should itself *be* an idea, or be like an idea.

136. It may be said—and some *have* said—that we lack a sense that would enable us to know substances, and that if we had such a sense we would know our own soul as we do a triangle. Our inability to perceive substances, on this view, is like the blind person's inability to see things. To this I answer that if we did have a new sense, all it could present us with would be some new sensations or ideas of sense, just as happens when someone is cured of blindness. But nobody, I think, will say that what he means by 'soul' and 'substance' is only some particular sort of idea or sensation! So when you think it through you can see that regarding our faculties as defective because they give us no idea of spirit or active thinking substance is as unreasonable as criticizing them because they don't enable us to comprehend a round square.

137. The opinion that spirits are to be known in the way that ideas and sensations are known has given rise to many absurd doctrines and much scepticism about the nature of the soul. It has probably led some people to doubt whether they had a soul, as distinct from their body, since they couldn't find that they had an idea of it. In fact, the mere meanings of the words are enough to refute the proposition that an idea (meaning: something inactive, whose existence consists in being perceived) could be the image or likeness of a spirit (meaning: an active thing that exists independently of being perceived).

138. 'Although an idea cannot resemble a spirit in its thinking, acting or existing independently,' you may say, 'it may resemble it in other ways. An idea or image of a thing needn't be like it in every respect.' I answer that if the idea doesn't resemble the thing in the ways I have mentioned, it can't possibly represent it in any other respect. If you leave out the power of willing, thinking and perceiving ideas, nothing remains in respect of which an idea could resemble a spirit. All we mean by the word 'spirit' is 'that which thinks, wills, and perceives'; this is the whole meaning of that term. So if none of *those* powers can be represented in an idea, there can be no idea at all of a spirit.

139. You may object that if no idea is signified by the terms 'soul', 'spirit' and 'substance', they must be meaningless. I answer that those words do mean or signify a real thing, which is neither an idea nor like an idea, but is a thing that perceives ideas, and wills, and reasons about them. I am myself a thing of that kind: what I refer to by the word 'I' is the same as what is meant by 'soul' or 'spiritual substance'. You may object:

Why quarrel over a word? The immediate significations of other general words are by common consent

called 'ideas', so there's no reason not to give that same label to what is signified by the general term 'spirit' or 'soul'.

To that I reply that the unthinking objects of the mind all have in common that they are entirely passive and exist only in being perceived; whereas a soul or spirit is an active being whose existence consists not in being perceived but in perceiving ideas and in thinking. These are two utterly, profoundly different categories of thing. So we need to maintain the distinction between 'spirit' and 'idea', so as to avoid ambiguity and running together things that are utterly opposite and unlike one another. See **27**.

140. In a broad sense, indeed, we can be said to have an idea or rather a *notion* of spirit—that is, we understand the meaning of the word 'spirit', otherwise we couldn't use it in affirming or denying things of spirits. Furthermore, we suppose that our own ideas resemble ideas in the minds of others; for example, my ideas of blueness or heat resemble the ideas of blueness and heat that other people have. In that sense our own soul is the image or idea of the souls of others because it resembles them. And so we conceive ideas in the minds of other spirits by means of our own ideas, and we know other spirits by means of our own soul.

141. Those who assert that the soul is naturally immortal mustn't be thought to mean that nothing, not even the infinite power of the creator who first brought it into existence, could possibly annihilate the soul. Their view is merely that the soul is not at risk of being broken or pulled apart in accordance with the ordinary laws of nature or motion. Some people think the soul of man to be only a thin living flame, or a gaseous system of 'animal spirits'; and on that view it is as easily destructible as the body, because nothing is more easily dissipated than flame or gas, which couldn't

possibly survive the ruin of the body that houses it. This view that the soul is naturally perishable has been eagerly embraced and cherished by the worst people, who see it as the strongest antidote to virtue and religion. But I have shown clearly that bodies, no matter what their structure or materials, including flames and 'animal spirits', are merely passive ideas in the mind. The mind itself is more unlike them than light is unlike darkness. I have shown that the soul is indivisible, incorporeal, unextended, and it is therefore incapable of being destroyed by natural processes. It can't fall apart because it has no parts. What we call 'the course of nature' is a series of motions, changes, decays and disintegrations that we see natural bodies undergoing constantly; none of this can possibly affect an active, simple, uncompounded substance: such a being therefore is indissoluble by the force of nature, which is to say that the human soul is naturally immortal.

142. What I have said presumably makes it clear that our souls cannot be known in the way that senseless, inactive objects are known; that is, we can't know them by having ideas of them. We can say of both spirits and ideas that they 'exist', 'are known' and so on, but these words don't mean that spirits have anything in common with ideas. They aren't alike in any respect; and we have no more chance of increasing our powers so that we can know a spirit as we do a triangle than we have of becoming able to see a sound! I emphasize this because I think it may help us to clear up several important questions and prevent some dangerous errors about the nature of the soul. Although it isn't strictly right to say that we have an *idea* of an active being or of an action, we can be said to have a *notion* of them. I have some knowledge or notion of my mind and of how it acts with regard to ideas, in that I know or understand what is meant by those words. When I know something, I have some

notion of it. The terms 'idea' and 'notion' *could* be treated as interchangeable with one another, if that is what people want; but we speak more clearly and properly when we distinguish very different things by giving them different names. Incidentally, because relations include an act of the mind it is less strictly accurate to say that we have *ideas* of relations and relational properties than to say that we have *notions* of them. But these days the word 'idea' is used more broadly, to cover spirits and relations and acts; and there's no point in fussing about this, because it is after all a verbal matter.

143. I should add that the doctrine of abstract ideas has had a large share in making intricate and obscure those sciences that focus on spiritual things. Men have imagined they could form abstract notions of the *powers* and *acts* of the mind, and could consider them apart from the mind or spirit itself, and also apart from their respective objects and effects. In this way a great many dark and indeterminate words, presumed to stand for abstract notions, have been introduced into metaphysics and morality, and from these have grown countless distractions and disputes amongst the learned.

144. But nothing seems to have contributed more to pulling men into controversies and mistakes about the nature and operations of the mind than their custom of speaking of them in terms borrowed from perceptible ideas. The *will* is termed the *motion of the soul*; which encourages people to liken the mind of man to a ball in motion, pushed and determined by the objects of sense as necessarily as the ball is by the stroke of a racket. This creates endless worries and dangerous errors in morality. All this could be cleared up, and the truth be made to appear plain, uniform, and consistent, if philosophers would only look into themselves and think hard about what they mean by what they say.

145. From what I have said, it is clear that the only way we can know that there are other spirits is through what they do—that is, the ideas they arouse in us. Some of the changes and recombinations that I perceive among my ideas inform me there are certain particular agents like myself, which accompany those ideas and concur in [= ‘agree to’, ‘go along with’] their production in my mind. Whereas I know about my own ideas immediately, my knowledge of other spirits is not immediate; it depends on the intervention of ideas that I take to be effects or signs of agents (spirits) other than myself.

146. ‘Those ‘other agents’, however, are not all human. Though we are sometimes convinced that human agents are involved in producing some events, everyone can see that the things we call ‘the works of nature’—that is, the great majority of the ideas or sensations that we perceive—are not produced by human wills and don’t depend on them in any way. So there must be some other spirit that causes them, since it is contradictory that they should exist by themselves. (See 29.) ‘What is the nature of that ‘other spirit’? Here is how we can find out. We can attend carefully to •how regular, orderly and inter-connected natural things are; to •the surprising magnificence, beauty and perfection of the larger parts of the creation, and the delicately intricate way in which its smaller parts are arranged; to •how harmoniously all the parts fit together; and, above all—this being something that we don’t view with the astonishment it deserves—to •the laws of pain and pleasure, and the instincts (that is, the natural inclinations, appetites, and emotions) of animals. If while considering all this we also attend to the nature of the attributes *one, eternal, infinitely wise, good and perfect*, we shall see clearly that they are attributes of that spirit I have mentioned—the one who makes everything happen and gives everything its reality.

147. Clearly, then, we know God as certainly and immediately as we know any mind or spirit other than ourselves. Indeed, God’s existence is *far more* evidently perceived than the existence of other men, because nature has infinitely more and bigger effects than those that are attributed to human agents. ‘Indeed, the things that are done by humans are at the same time effects of nature—that is, they are also done by God’. Every sign of a man’s existence—that is, every effect produced by a man—points even more strongly to the existence of that spirit who is the author of nature. ‘Here is why’. When you have an effect on me, all that you actually will to do is to move your own limbs or larynx; that the movements you make with *your* body should lead to any change in the ideas in *my* mind depends wholly on the will of the creator. It is he alone who keeps other spirits ‘in step’ with one another in such a way that they can perceive one another’s existence. Yet this pure, clear light that illuminates us all, making us visible to one another, is in itself invisible.

148. The unthinking herd all seem to hold that they cannot see God. ‘If only we could see him in the way we see a man,’ they say, ‘we would believe that he exists and, as believers, obey his commands.’ But, unfortunately ‘for them’, we need only open our eyes to have a fuller and clearer view of the sovereign lord of all things than we have of any one of our fellow-creatures! I am not supposing that we have a direct and immediate view of God (as some think we do), or that when we see bodies we do so not directly but rather by seeing something that represents them in the essence of God (‘as Malebranche thinks we do’)—a doctrine that I confess to finding incomprehensible. Let me explain what I do mean. A human spirit or person isn’t perceived by sense, because it isn’t an idea; so when we see the colour, size, shape, and motions of a man, all we perceive are certain sensations or ideas caused in our own minds; and these, being exhibited

to us in various distinct collections, serve to indicate to us the existence of finite created spirits like ourselves. Clearly, then, we don't *see a man*, if by 'man' is meant something that lives, moves, perceives, and thinks as we do. What we perceive is a certain collection of ideas that leads us to think there is a distinct source of thought and motion like ourselves, accompanying it and represented by it. That is also how we see God. The only difference is that whereas some one finite and narrow assemblage of ideas points to a particular human mind, we perceive clear indications of the divinity wherever we look, at any time and in any place. That is because everything we see, hear, feel, or in any way perceive by sense is a sign or effect of the power of God; as is our perception of the motions that are produced by men.

149. Clearly, then, nothing can be more evident to anyone who is capable of the least reflection than the existence of God, or a spirit •who is intimately present to our minds, producing in them all the variety of ideas or sensations that we continually undergo, •on whom we have an absolute and entire dependence, in short, •in whom we live and move and have our being. Very few people have reasoned their way to this great truth, which lies so near and obvious to the mind. That is a sad example of the stupidity and inattention of men who, though they are surrounded with such clear manifestations of God, are so little affected by them that it is as though they were blinded with excess of light.

150. 'But', you will say, 'doesn't *nature* have a share in the production of natural things? Must they all be ascribed to the immediate operation of God and nothing else?' I answer that if by 'nature' you mean only the visible series of effects or sensations imprinted on our minds according to certain fixed and general laws, then clearly nature (in this sense) cannot produce anything at all. But if by 'nature' you mean

some being distinct from God, from the laws of nature, *and* from the things perceived by sense, I have to say that the word is to me an empty sound with no intelligible meaning. Nature in this meaning of the word is a vain chimera, introduced by heathens who didn't grasp the omnipresence and infinite perfection of God. It is harder to explain its being accepted among Christians who profess belief in the holy scriptures; for the latter constantly ascribe to the immediate hand of God the effects that heathen philosophers customarily attribute to nature. [Berkeley here gives three biblical quotations.] But although this is the constant language of scripture, yet Christians are weirdly reluctant to believe that God concerns himself so nearly in our affairs. They would prefer to suppose him to be at a great distance from us, and substitute *matter*, i.e. a blind unthinking deputy in his place, though St. Paul says that God is 'not far from every one of us'.

151. No doubt these objections will be raised:

The slow and gradual methods that are kept to in the production of natural things don't seem to be caused by the immediate hand of an almighty agent. Furthermore, monsters, untimely births, fruits blasted in the blossom, rains falling in desert places, miseries incident to human life, are all evidence that the whole frame of nature isn't immediately actuated and superintended by a spirit of infinite wisdom and goodness.

But much of the answer to this is plain from **62**: those methods of nature are absolutely necessary if things are to go according to the most simple and general rules, and in a steady and consistent manner; and that is evidence for both the wisdom and goodness of God. This mighty machine of nature is so skillfully contrived that while its motions and various phenomena strike on our senses, the hand that drives the whole thing is itself not perceivable by men of

flesh and blood. ‘Verily,’ says the prophet ‘thou art a God that hidest thyself’ (*Isaiah* xlv.15). But though God conceals himself from the eyes of sensual and lazy people who won’t take the slightest trouble to *think*, to an unbiassed and attentive mind nothing can be more plainly legible than the close presence of an all-wise spirit who designs, regulates, and sustains the whole system of being. It is clear from what I have pointed out elsewhere that operating according to general and stated laws is necessary for our guidance in the affairs of life, and for letting us into the secret of nature; so much so that without such laws all breadth of thought, all human wisdom and design, would be useless—indeed there couldn’t *be* any such faculties or powers in the mind. See 31. That single consideration is far more than enough to counterbalance whatever particular inconveniences may arise from the order of nature.

152. Bear in mind also that the very blemishes and defects of nature are of some use, because they make an agreeable sort of variety, and augment the beauty of the rest of the creation, as shadows in a picture serve to set off the brighter and more sunlit parts. You would also do well to think critically about the tendency to charge the author of nature with imprudence because of the waste of seeds and embryos and the accidental destruction of plants and animals before they come to full maturity. Doesn’t this come from a prejudice that was acquired through familiarity with powerless mortals who have to scrimp and save? We may indeed think it wise for a *man* to manage thriftily things that he can’t acquire without work and trouble. But we mustn’t imagine that the inexplicably fine system of an animal or vegetable costs the great creator any more work or trouble in its production than a pebble does; for nothing is more evident than the fact that an omnipotent spirit can casually produce anything by a mere fiat or act of his will. This makes it clear that the splen-

did profusion of natural things shouldn’t be interpreted as weakness or wastefulness in the agent who produces them, but rather be looked on as evidence of how richly powerful he is.

153. As for the mixture of pain or uneasiness that the world contains, as a result of the general laws of nature and the actions of finite imperfect spirits: this, in the state we are in at present, is indispensably necessary to our well-being. But our field of vision is too narrow: we take, for instance, the idea of some one particular pain into our thoughts, and count it as evil; whereas if we take a broader view so as to take in •the various ends, connections, and dependencies of things, •on what occasions and in what proportions we are affected with pain and pleasure, •the nature of human freedom, and •the design with which we are put into the world—*then* we shall be forced to admit that particular things that appear to be *evil* when considered by themselves have the nature of *good* when considered as linked with the whole system of beings.

154. From what I have said it will be obvious to any thinking person that the only reason anyone has sided with atheism or with the Manichean heresy •according to which reality is the product of opposing forces of good and evil• is that there has been too little attention and too little breadth of view. Thoughtless little souls may indeed mock the works of providence, whose beauty and order they can’t *or won’t* take in. But those who are capable of breadth and balance in their thought, and are also thoughtful in temperament, can never sufficiently admire the divine traces of wisdom and goodness that shine throughout the economy of nature. Still, what truth is there that shines so strongly on the mind that we cannot escape seeing it by turning our thought away from it, wilfully shutting our eyes? So is it any wonder that the

general run of men, who are always intent on business or pleasure, and aren't accustomed to focussing or opening the eye of their mind, should have less conviction and certainty of the existence of God than might be expected in reasonable creatures?

155. We should wonder that there are men so stupid as to neglect such an evident and momentous truth, rather than wondering that they don't believe it, given that they neglect it. And yet it is to be feared that too many intelligent, leisured people who live in Christian countries have sunk into a sort of *atheism*, simply through a slack and dreadful negligence. For it is downright impossible that a soul pierced and enlightened with a thorough sense of the omnipresence, holiness, and justice of that almighty spirit, should persist in remorselessly violating his laws. We ought therefore earnestly to meditate and dwell on those important points, so as to become convinced beyond all doubt that *the eyes of the Lord are in every place beholding the evil and the*

good; that he is with us and keeps us in all places to which we go, and gives us bread to eat, and clothes to wear; that he is present and conscious to our innermost thoughts; and that we have a most absolute and immediate dependence on him. A clear view of these great truths cannot but fill our heart with awed caution and holy fear, which is the strongest incentive to virtue and the best guard against vice.

156. For, after all, the first place in our studies should be given to the consideration of God and of our duty. The main purpose of my labours has been to promote such a consideration; so I shall regard them as altogether useless and ineffectual if what I have said doesn't inspire my readers with a pious sense of the presence of God, and—having shown the falseness or emptiness of those barren speculations that make the chief employment of learned men—make them more disposed to reverence and to embrace the salutary truths of the gospel, the knowledge and practice of which is the highest perfection of human nature.