

PART III.

OF KNOWLEDGE AND PROBABILITY.

SECTION I.

Of knowledge.

THERE are ¹seven different kinds of philosophical relation, SECT. I.
viz. resemblance, identity, relations of time and place, propor- ↔↔↔
tion in quantity or number, degrees in any quality, contrariety, Of know-
and causation. These relations may be divided into two ledge.
classes; into such as depend entirely on the ideas, which we
compare together, and such as may be chang'd without any
change in the ideas. 'Tis from the idea of a triangle, that
we discover the relation of equality, which its three angles
bear to two right ones; and this relation is invariable, as
long as our idea remains the same. On the contrary, the
relations of *contiguity* and *distance* betwixt two objects may
be chang'd merely by an alteration of their place, without
any change on the objects themselves or on their ideas;
and the place depends on a hundred different accidents,
which cannot be foreseen by the mind. 'Tis the same case
with *identity* and *causation*. Two objects, tho' perfectly re-
sembling each other, and even appearing in the same place
at different times, may be numerically different: And as the
power, by which one object produces another, is never
discoverable merely from their idea, 'tis evident *cause* and
effect are relations, of which we receive information from
experience, and not from any abstract reasoning or reflex-
ion. There is no single phænomenon, even the most simple,

¹ Part I. sect. 5.

PART III. which can be accounted for from the qualities of the objects, as they appear to us; or which we cou'd foresee without the help of our memory and experience.

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Of know-
ledge and
probability.

It appears, therefore, that of these seven philosophical relations, there remain only four, which depending solely upon ideas, can be the objects of knowledge and certainty. These four are *resemblance, contrariety, degrees in quality, and proportions in quantity or number*. Three of these relations are discoverable at first sight, and fall more properly under the province of intuition than demonstration. When any objects *resemble* each other, the resemblance will at first strike the eye, or rather the mind; and seldom requires a second examination. The case is the same with *contrariety*, and with the *degrees* of any *quality*. No one can once doubt but existence and non-existence destroy each other, and are perfectly incompatible and contrary. And tho' it be impossible to judge exactly of the degrees of any quality, such as colour, taste, heat, cold, when the difference betwixt them is very small; yet 'tis easy to decide, that any of them is superior or inferior to another, when their difference is considerable. And this decision we always pronounce at first sight, without any enquiry or reasoning.

We might proceed, after the same manner, in fixing the *proportions of quantity or number*, and might at one view observe a superiority or inferiority betwixt any numbers, or figures; especially where the difference is very great and remarkable. As to equality or any exact proportion, we can only guess at it from a single consideration; except in very short numbers, or very limited portions of extension; which are comprehended in an instant, and where we perceive an impossibility of falling into any considerable error. In all other cases we must settle the proportions with some liberty, or proceed in a more *artificial* manner.

I have already observ'd, that geometry, or the *art*, by which we fix the proportions of figures; tho' it much excels, both in universality and exactness, the loose judgments of

the senses and imagination; yet never attains a perfect precision and exactness. Its first principles are still drawn from the general appearance of the objects; and that appearance can never afford us any security, when we examine the prodigious minuteness of which nature is susceptible. Our ideas seem to give a perfect assurance, that no two right lines can have a common segment; but if we consider these ideas, we shall find, that they always suppose a sensible inclination of the two lines, and that where the angle they form is extremely small, we have no standard of a right line so precise, as to assure us of the truth of this proposition. 'Tis the same case with most of the primary decisions of the mathematics.

SECT. I.
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*Of know-
ledge.*

There remain, therefore, algebra and arithmetic as the only sciences, in which we can carry on a chain of reasoning to any degree of intricacy, and yet preserve a perfect exactness and certainty. We are possess'd of a precise standard, by which we can judge of the equality and proportion of numbers; and according as they correspond or not to that standard, we determine their relations, without any possibility of error. When two numbers are so combin'd, as that the one has always an unite answering to every unite of the other, we pronounce them equal; and 'tis for want of such a standard of equality in extension, that geometry can scarce be esteem'd a perfect and infallible science.

But here it may not be amiss to obviate a difficulty, which may arise from my asserting, that tho' geometry falls short of that perfect precision and certainty, which are peculiar to arithmetic and algebra, yet it excels the imperfect judgments of our senses and imagination. The reason why I impute any defect to geometry, is, because its original and fundamental principles are deriv'd merely from appearances; and it may perhaps be imagin'd, that this defect must always attend it, and keep it from ever reaching a greater exactness in the comparison of objects or ideas, than what our eye or imagination alone is able to attain. I own that this defect so

PART III. far attends it, as to keep it from ever aspiring to a full
 certainty: But since these fundamental principles depend on
 the easiest and least deceitful appearances, they bestow on
 their consequences a degree of exactness, of which these
 consequences are singly incapable. 'Tis impossible for the
 eye to determine the angles of a chiliagon to be equal to 1996
 right angles, or make any conjecture, that approaches this
 proportion; but when it determines, that right lines cannot
 concur; that we cannot draw more than one right line
 between two given points; its mistakes can never be of any
 consequence. And this is the nature and use of geometry,
 to run us up to such appearances, as, by reason of their
 simplicity, cannot lead us into any considerable error.

Of know-
 ledge and
 probability.

I shall here take occasion to propose a second observation
 concerning our demonstrative reasonings, which is suggested
 by the same subject of the mathematics. 'Tis usual with
 mathematicians, to pretend, that those ideas, which are their
 objects, are of so refin'd and spiritual a nature, that they fall
 not under the conception of the fancy, but must be com-
 prehended by a pure and intellectual view, of which the
 superior faculties of the soul are alone capable. The same
 notion runs thro' most parts of philosophy, and is principally
 made use of to explain our abstract ideas, and to shew how
 we can form an idea of a triangle, for instance, which shall
 neither be an isosceles nor scalenum, nor be confin'd to any
 particular length and proportion of sides. 'Tis easy to see,
 why philosophers are so fond of this notion of some spiritual
 and refin'd perceptions; since by that means they cover
 many of their absurdities, and may refuse to submit to the
 decisions of clear ideas, by appealing to such as are obscure
 and uncertain. But to destroy this artifice, we need but
 reflect on that principle so oft insisted on, *that all our ideas
 are copy'd from our impressions.* For from thence we may
 immediately conclude, that since all impressions are clear
 and precise, the ideas, which are copy'd from them, must be
 of the same nature, and can never, but from our fault, con-

tain any thing so dark and intricate. An idea is by its very nature weaker and fainter than an impression ; but being in every other respect the same, cannot imply any very great mystery. If its weakness render it obscure, 'tis our business to remedy that defect, as much as possible, by keeping the idea steady and precise ; and till we have done so, 'tis in vain to pretend to reasoning and philosophy.

SECT. II.
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*Of probability ; and
 of the idea
 of cause
 and effect.*

SECTION II.

Of probability ; and of the idea of cause and effect.

THIS is all I think necessary to observe concerning those four relations, which are the foundation of science ; but as to the other three, which depend not upon the idea, and may be absent or present even while *that* remains the same, 'twill be proper to explain them more particularly. These three relations are *identity, the situations in time and place, and causation.*

All kinds of reasoning consist in nothing but a *comparison*, and a discovery of those relations, either constant or inconstant, which two or more objects bear to each other. This comparison we may make, either when both the objects are present to the senses, or when neither of them is present, or when only one. When both the objects are present to the senses along with the relation, we call *this* perception rather than reasoning ; nor is there in this case any exercise of the thought, or any action, properly speaking, but a mere passive admission of the impressions thro' the organs of sensation. According to this way of thinking, we ought not to receive as reasoning any of the observations we may make concerning *identity*, and the *relations of time and place* ; since in none of them the mind can go beyond what is immediately present to the senses, either to discover the real existence or the relations of objects. 'Tis only *causation*, which produces such a connexion, as to give us assurance from the existence or