

Selections from *The Principles of Philosophy**

PART I -- OF THE PRINCIPLES OF HUMAN KNOWLEDGE

43. *That we shall never err if we give our assent only to what we clearly and distinctly perceive.*

But it is certain we will never admit falsity for truth, so long as we judge only of that which we clearly and distinctly perceive; because, as God is no deceiver, the faculty of knowledge which he has given us cannot be fallacious, nor, for the same reason, the faculty of will, when we do not extend it beyond the objects we clearly know. And even although this truth could not be established by reasoning, the minds of all have been so impressed by nature as spontaneously to assent to whatever is clearly perceived, and to experience an impossibility to doubt of its truth.

48. *That all the objects of our knowledge are to be regarded either (1) as things or the affections of things: or (2) as eternal truths; with the enumeration of things.*

Whatever objects fall under our knowledge we consider either as things or the affections of things,[Footnote: Things and the affections of things are (in the French) equivalent to "what has some (*i.e.*, a *real*) existence," as opposed to the class of "eternal truths," which have merely an *ideal* existence.] or as eternal truths possessing no existence beyond our thought. Of the first class the most general are substance, duration, order, number, and perhaps also some others, which notions apply to all the kinds of things. I do not, however, recognise more than two highest kinds (*summa genera*) of things; the first of intellectual things, or such as have the power of thinking, including mind or thinking substance and its properties;

the second, of material things, embracing extended substance, or body and its properties. Perception, volition, and all modes as well of knowing as of willing, are related to thinking substance; on the other hand, to extended substance we refer magnitude, or extension in length, breadth, and depth, figure, motion, situation, divisibility of parts themselves, and the like. There are, however, besides these, certain things of which we have an internal experience that ought not to be referred either to the mind of itself, or to the body alone, but to the close and intimate union between them, as will hereafter be shown in its place. Of this class are the appetites of hunger and thirst, etc., and also the emotions or passions of the mind which are not exclusively mental affections, as the emotions of anger, joy, sadness, love, etc.; and, finally, all the sensations, as of pain, titillation, light and colours, sounds, smells, tastes, heat, hardness, and the other tactile qualities.

53. *That of every substance there is one principal attribute, as thinking of the mind, extension of the body.*

But, although any attribute is sufficient to lead us to the knowledge of substance, there is, however, one principal property of every substance, which constitutes its nature or essence, and upon which all the others depend. Thus, extension in length, breadth, and depth, constitutes the nature of corporeal substance; and thought the nature of thinking substance. For every other thing that can be attributed to body, presupposes extension, and is only some mode of an extended thing; as all the properties we discover in the mind are only diverse modes of thinking. Thus, for example, we cannot conceive figure unless in something extended, nor motion unless in extended space, nor imagination, sensation, or will, unless in a thinking thing. But, on the other hand, we can conceive extension without figure or motion, and thought without imagination or sensation, and so of the others; as is clear to any one who attends to these matters.

PART II -- OF THE PRINCIPLES OF MATERIAL THINGS.

* Translation by John Veitch. Online at <http://www.classicallibrary.org/descartes/principles/index.htm>

4. *That the nature of body consists not in weight hardness, colour and the like, but in extension alone.*

In this way we will discern that the nature of matter or body, considered in general, does not consist in its being hard, or ponderous, or coloured, or that which affects our senses in any other way, but simply in its being a substance extended in length, breadth, and depth. For with respect to hardness, we know nothing of it by sense farther than that the parts of hard bodies resist the motion of our hands on coming into contact with them; but if every time our hands moved towards any part, all the bodies in that place receded as quickly as our hands approached, we should never feel hardness; and yet we have no reason to believe that bodies which might thus recede would on this account lose that which makes them bodies. The nature of body does not, therefore, consist in hardness. In the same way, it may be shown that weight, colour, and all the other qualities of this sort, which are perceived in corporeal matter, may be taken from it, itself meanwhile remaining entire: it thus follows that the nature of body depends on none of these.

11. *How space is not in reality different from corporeal substance.*

And indeed it will be easy to discern that it is the same extension which constitutes the nature of body as of space, and that these two things are mutually diverse only as the nature of the genus and species differs from that of the individual, provided we reflect on the idea we have of any body, taking a stone for example, and reject all that is not essential to the nature of body. In the first place, then, hardness may be rejected, because if the stone were liquefied or reduced to powder, it would no longer possess hardness, and yet would not cease to be a body; colour also may be thrown out of account, because we have frequently seen stones so transparent as to have no colour; again, we may reject weight, because we have the case of fire, which, though very light, is still a body; and, finally, we may reject cold, heat, and all the other qualities of this sort, either because they are not considered as in the stone, or because, with the change of these qualities, the stone is not supposed to have lost the

nature of body. After this examination we will find that nothing remains in the idea of body, except that it is something extended in length, breadth, and depth; and this something is comprised in our idea of space, not only of that which is full of body, but even of what is called void space.

12. *How space differs from body in our mode of conceiving it.*

There is, however, some difference between them in the mode of conception; for if we remove a stone from the space or place in which it was, we conceive that its extension also is taken away, because we regard this as particular, and inseparable from the stone itself: but meanwhile we suppose that the same extension of place in which this stone was remains, although the place of the stone be occupied by wood, water, air, or by any other body, or be even supposed vacant, because we now consider extension in general, and think that the same is common to stones, wood, water, air, and other bodies, and even to a vacuum itself, if there is any such thing, provided it be of the same magnitude and figure as before, and preserve the same situation among the external bodies which determine this space.

13. *What external place is.*

The reason of which is, that the words place and space signify nothing really different from body which is said to be in place, but merely designate its magnitude, figure, and situation among other bodies. For it is necessary, in order to determine this situation, to regard certain other bodies which we consider as immovable; and, according as we look to different bodies, we may see that the same thing at the same time does and does not change place. For example, when a vessel is being carried out to sea, a person sitting at the stern may be said to remain always in one place, if we look to the parts of the vessel, since with respect to these he preserves the same situation; and on the other hand, if regard be had to the neighbouring shores, the same person will seem to be perpetually changing place, seeing he is constantly receding from one shore and approaching another. And besides, if we suppose that the earth moves, and that it makes precisely as much way from west to east as the vessel from east to

west, we will again say that the person at the stern does not change his place, because this place will be determined by certain immovable points which we imagine to be in the heavens. But if at length we are persuaded that there are no points really immovable in the universe, as will hereafter be shown to be probable, we will thence conclude that nothing has a permanent place unless in so far as it is fixed by our thought.

15. *How external place is rightly taken for the superficies of the surrounding body.*

And thus we never indeed distinguish space from extension in length, breadth, and depth; we sometimes, however, consider place as in the thing placed, and at other times as out of it. Internal place indeed differs in no way from space; but external place may be taken for the superficies that immediately surrounds the thing placed. It ought to be remarked that by superficies we do not here understand any part of the surrounding body, but only the boundary between the surrounding and surrounded bodies, which is nothing more than a mode; or at least that we speak of superficies in general which is no part of one body rather than another, but is always considered the same, provided it retain the same magnitude and figure. For although the whole surrounding body with its superficies were changed, it would not be supposed that the body which was surrounded by it had therefore changed its place, if it meanwhile preserved the same situation with respect to the other bodies that are regarded as immovable. Thus, if we suppose that a boat is carried in one direction by the current of a stream, and impelled by the wind in the opposite with an equal force, so that its situation with respect to the banks is not changed, we will readily admit that it remains in the same place, although the whole superficies which surrounds it is incessantly changing.

21. *It is thus also demonstrated that the extension of the world is indefinite.*

We further discover that this world or the whole (*universitas*) of corporeal substance, is extended without limit, for wherever we fix a

limit, we still not only imagine beyond it spaces indefinitely extended, but perceive these to be truly imaginable, in other words, to be in reality such as we imagine them; so that they contain in them corporeal substance indefinitely extended, for, as has been already shown at length, the idea of extension which we conceive in any space whatever is plainly identical with the idea of corporeal substance.

22. *It also follows that the matter of the heavens and earth is the same, and that there cannot be a plurality of worlds.*

And it may also be easily inferred from all this that the earth and heavens are made of the same matter; and that even although there were an infinity of worlds, they would all be composed of this matter; from which it follows that a plurality of worlds is impossible, because we clearly conceive that the matter whose nature consists only in its being an extended substance, already wholly occupies all the imaginable spaces where these other worlds could alone be, and we cannot find in ourselves the idea of any other matter.

23. *That all the variety of matter, or the diversity of its forms, depends on motion.*

There is therefore but one kind of matter in the whole universe, and this we know only by its being extended. All the properties we distinctly perceive to belong to it are reducible to its capacity of being divided and moved according to its parts; and accordingly it is capable of all those affections which we perceive can arise from the motion of its parts. For the partition of matter in thought makes no change in it; but all variation of it, or diversity of form, depends on motion. The philosophers even seem universally to have observed this, for they said that nature was the principle of motion and rest, and by nature they understood that by which all corporeal things become such as they are found in experience.

25. *What motion is properly so called.*

But if, instead of occupying ourselves with that which has no foundation, unless in ordinary usage, we desire to know what ought

to be understood by motion according to the truth of the thing, we may say, in order to give it a determinate nature, that it is *the transporting of one part of matter or of one body from the vicinity of those bodies that are in immediate contact with it, or which we regard as at rest, to the vicinity of other bodies*. By a body as a part of matter, I understand all that which is transferred together, although it be perhaps composed of several parts, which in themselves have other motions; and I say that it is the transporting and not the force or action which transports, with the view of showing that motion is always in the movable thing, not in that which moves; for it seems to me that we are not accustomed to distinguish these two things with sufficient accuracy. Further, I understand that it is a mode of the movable thing, and not a substance, just as figure is a property of the thing figured, and repose of that which is at rest.

[The remaining translations are from *The Philosophical Writings of Descartes* (vol. 1, pp. 235-252), translated and edited by J. Cottingham, R. Stoothoff, and D. Murdoch (1985), Cambridge Univ. Press.]

27. *Motion and rest are merely various modes of a body in motion.* We are dealing here not with the action which is understood to exist in the body which produces or arrests the motion, but simply with the transfer of a body, and with the absence of a transfer, i.e., rest. So it is clear that this transfer cannot exist outside the body which is in motion, and that when there is a transfer of motion, the body is in a different state from when there is no transfer, i.e., when it is at rest. Thus motion and rest are nothing else but two different modes of a body.

29. *[Motion] ... is to be referred only to those contiguous bodies which are regarded as being at rest.*

I further specified that the transfer occurs from the vicinity not of any contiguous bodies but from the vicinity of those which 'are regarded as being at rest'. For transfer is in itself a reciprocal process: we cannot understand that a body AB is transferred from

the vicinity of a body CD without simultaneously understanding that CD is transferred from the vicinity of AB. Exactly the same force and action is needed on both sides. So if we wished to characterize motion strictly in terms of its own nature, without reference to anything else, then in the case of two contiguous bodies being transferred in opposite directions, and thus separated, we should say that there was just as much motion in the one body as in the other. But this would clash too much with our ordinary way of speaking. For we are used to standing on the earth and regarding it as at rest; so although we may see some of its parts, which are contiguous with other smaller bodies, being transferred out of their vicinity, we do not for that reason think of the earth itself as in motion.

36. *God is the primary cause of motion; and he always preserves the same quantity of motion in the universe.*

After this consideration of the nature of motion, we must look at its cause. This is in fact twofold: first, there is the universal and primary cause -- the general cause of all the motions in the world; and second there is the particular cause which produces in an individual piece of matter some motion which it previously lacked. Now as far as the general cause is concerned, it seems clear to me that this is no other than God himself. In the beginning <in his omnipotence> he created matter, along with its motion and rest; and now, merely by his regular concurrence, he preserves the same amount of motion and rest in the material universe as he put there in the beginning. Admittedly motion is simply a mode of the matter which is moved. But nevertheless it has a certain determinate quantity; and this, we easily understand, may be constant in the universe as a whole while varying in any given part. Thus if one part of matter moves twice as fast as another which is twice as large, we must consider that there is the same quantity of motion in each part; and if one part slows down, we must suppose that some other part of equal size speeds up by the same amount. For we understand that God's perfection involves not only his being immutable in himself, but also his operating in a manner that is always utterly constant

and immutable. Now there are some changes whose occurrence is guaranteed either by our own plain experience or by divine revelation, and either our perception or our faith shows us that these take place without any change in the creator; but apart from these we should not suppose that any other changes occur in God's works, in case this suggests some inconstancy in God. Thus, God imparted various motions to the parts of matter when he first created them, and he now preserves all this matter in the same way, and by the same process by which he originally created it; and it follows from what we have said that this fact alone makes it most reasonable to think that God likewise always preserves the same quantity of motion in matter.

37. *The first law of nature: each and every thing, in so far as it can, always continues in the same state; and thus what is once in motion always continues to move.*

From God's immutability we can also know certain rules or laws of nature, which are the secondary and particular causes of the various motions we see in particular bodies. The first of these laws is that each thing, in so far as it is simple and undivided, always remains in the same state, as far as it can, and never changes except as a result of external causes. Thus, if a particular piece of matter is square, we can be sure without more ado that it will remain square forever, unless something coming from outside changes its shape. If it is at rest, we hold that it will never begin to move unless it is pushed into motion by some cause. And if it moves, there is equally no reason for thinking it will ever lose this motion of its own accord and without being checked by something else. Hence we must conclude that what is in motion always, so far as it can, continues to move. But we live on the Earth, whose composition is such that all motions occurring near it are soon halted, often by causes undetectable by our senses. Hence from our earliest years we have often judged that such motions, which are in fact stopped by causes unknown to us, come to an end of their own accord. And we tend to believe that what we have apparently experienced in many cases holds good in all cases -- namely that it is in the very nature of motion to come to an end, or

to tend towards a state of rest. This, of course, <is a false preconceived opinion which> is utterly at variance with the laws of nature; for rest is the opposite of motion, and nothing can by its own nature tend towards its opposite, or towards its own destruction.

38. *The motion of projectiles.*

Indeed, our everyday experience of projectiles completely confirms this first rule of ours. For there is no other reason why a projectile would persist in motion for some time after it leaves the hand that throws it, except that what is once in motion continues to move until it is slowed down by bodies that are in the way. And it is clear that projectiles are normally slowed down, little by little, by the air or other fluid bodies in which they are moving, and that this is why their motion cannot persist for long. The fact that air offers resistance to other moving bodies may be confirmed either by our own experience, through the sense of touch if we beat the air with a fan, or by the flight of birds. And in the case of any other fluid, the resistance offered to the motion of a projectile is even more obvious than in the case of air.

39. *The second law of nature: all motion is in itself rectilinear; and hence any body moving in a circle always tends to move away from the centre of the circle which it describes.*

The second law is that every piece of matter, considered in itself, always tends to continue moving, not in any oblique path but only in a straight line. This is true despite the fact that many particles are often forcibly deflected by the impact of other bodies; and, as I have said above, in any motion the result of all the matter moving simultaneously is a kind of circle. The reason for this second rule is the same as the reason for the first rule, namely the immutability and simplicity of the operation by which God preserves motion in matter. For he always preserves the motion in the precise form in which it is occurring at the very moment when he preserves it, without taking any account of the motion which was occurring a little while earlier. It is true that no motion takes place in a single instant of time; but clearly whatever is in motion is determined, at the individual

instants which can be specified as long as the motion lasts, to continue moving in a given direction along a straight line, and never in a curve...

40. *The third law: if a body collides with another body that is stronger than itself, it loses none of its motion; but if it collides with a weaker body, it loses a quantity of motion equal to that which it imparts to the other body.*

The third law of nature is this: when a moving body collides with another, if its power of continuing in a straight line is less than the resistance of the other body, it is deflected so that, while the quantity of motion is retained, the direction is altered; but if its power of continuing is greater than the resistance of the other body, it carries that body along with it, and loses a quantity of motion equal to that which it imparts to the other body. Thus we find that when hard projectiles strike some other hard body, they do not stop, but rebound in the opposite direction; when, by contrast, they encounter a soft body, they are immediately halted because they readily transfer all their motion to it. All the particular causes of the changes which bodies undergo are covered by this third law -- or at least the law covers all changes which are themselves corporeal. I am not here inquiring into the existence or nature of any power to move bodies which may be possessed by human minds, or the minds of angels, since I am reserving this topic for a treatise *On Man* < which I hope to produce >.

PART III -- OF THE VISIBLE WORLD.

28. *Strictly speaking, the earth does not move, any more than the planets, although they are all carried along by the heaven.*

Here we must bear in mind what I said above about the nature of motion, namely that if we use the term 'motion' in the strict sense and in accordance with the truth of things, then motion is simply the transfer of one body from the vicinity of the other bodies which are in immediate contact with it, and which are regarded as being at

rest, to the vicinity of other bodies. But it often happens that, in accordance with ordinary usage, any action whereby a body travels from one place to another is called 'motion'; and in this sense it can be said that the same thing moves and does not move at the same time, depending on how we determine its location. It follows from this that in the strict sense there is no motion occurring in the case of the earth or even the other planets, since they are not transferred from the vicinity of those parts of the heaven with which they are in immediate contact, in so far as these parts are considered as being at rest. Such a transfer would require them to move away from all these parts at the same time, which does not occur. But since the celestial material is fluid, at any given time different groups of particles move away from the planet with which they are in contact, by a motion which should be attributed solely to the particles, not to the planet. In the same way, the partial transfers of water and air which occur on the surface of the earth are not normally attributed to the earth itself, but to the parts of water and air which are transferred.