

# **An Introduction to Natural Science, Establishing the Fundamentals for the Explanation of the Events and Changes that occur in Nature.**

## **Chapter 1**

### **On Natural Science in General.**

1. *Natural science is a science that aims to explain the causes of change that occur on material bodies.*

Wherever there is a change, there must be a cause for it, since it is certain that nothing can happen without a sufficient reason. Whoever can point to the reason why a change has occurred, has found its cause, and thus fulfils the ultimate aim of Natural Science. This ultimate aim is focussed only on changes, for as long as an object remains in the same state, the only conclusion that can be reached is that all causes that could produce a change are absent. But as soon as a change occurs, one is entitled to ask for its cause, and Natural Science endeavors to determine the causes of all changes. However in this our Science is very incomplete, since we are able to state with certainty the causes of only very few changes; we can therefore not expect Natural Science to point to the causes of all changes. Accordingly, we take the domain of Natural Science to be the attempt to determine the causes of changes that take place. Moreover, changes are here restricted to those that occur on material bodies, thus distinguishing Natural Science from the science of the mind, which aims to explain mental changes.

2. *All changes involving material bodies must arise from the essence and from the properties of the bodies themselves.*

The cause of such a change must lie either within the body itself or outside it; in the former case the position is clear, and the cause, as well as the change that it brings about must be sought in the essence and in the properties of the body. In the other case, although the cause is not located in the bodies, the change itself takes place within the bodies, and must consequently be based on their essence and properties. From these one can conclude what possible types of change a body can undergo, irrespective of the causes which could bring them about. In Natural Science two matters need always to be considered: firstly the change itself that has occurred, and secondly the cause that brought it about. The former is without doubt always based on the essence and properties of the material bodies, and this is sufficient to maintain our proposition. But if the cause is not located in the material bodies, then it must of necessity be ascribed to a mind, since in this

world one cannot consider any entities other than material bodies or minds. However changes in material bodies caused by minds, as well as miracles caused

by divine power, are beyond the limits of Natural Science. We note that when a change cannot possibly be explained as arising from the characteristics of material bodies, it must be of needs be ascribed to a mind or even be regarded as a miracle.

*3. Before all else it is therefore necessary to explore the essence and properties of material bodies.*

Most scholars regard the essence of material bodies as forever unfathomable. According to this view we must be content with becoming aware of some of their properties, and not to attempt explanation of changes in material bodies that are not based on these properties. This is not the place to decide on the possibility or impossibility of completely understanding the essence of material bodies; first we must apply all effort to gain such understanding, after which it will not be difficult to judge the extent to which we have succeeded. All properties of material bodies are contained in their essence, and if one has recognized their essence, all their properties are no longer a secret. Likewise, if one has recognized all possible properties of bodies, their essence is known. Therefore the first and foremost effort of Natural Science must be to determine the properties of material bodies by accurate examination.

*4. What is common to all material bodies without exception is called a property of the bodies, and therefore all things not sharing this property are excluded from the domain of material bodies.*

Here we speak of the general properties of bodies, which all share without exception. These must be distinguished from those properties possessed only by a particular type of body. Before considering the latter we must in the first instance examine the properties common to all bodies. Their consideration will teach us what types of change in material bodies quite generally can be explained by these common properties, whilst in particular types of bodies changes are possible that must be explained by their particular properties. Two routes can lead us to the recognition of the general properties of all bodies. The first way consists in examining what all material bodies have in common. But since we are able to carry out such an examination on only a small fraction of bodies in the universe, we use with greater assurance the other route, which consists in regarding all that to be the properties of bodies, without which they would cease to be bodies. For a property which is such that when it is absent in a thing, we would not regard the thing as a body, can justly be regarded as a general property of bodies. Since we presuppose a concept of bodies, which, although incomplete, is adequate to distinguish bodies from things that are not bodies, we can, using this concept, determine the general properties of bodies. And this development of the general properties will lead us in due course to a complete concept of bodies, through

which we will eventually with certainty reach a complete understanding of all properties and even of the essence of material bodies.

5. *The essence of material bodies is a property that is not only shared by all material bodies, but which is such that all things having this property must of necessity be considered to be material bodies.*

For some property, its absence in a thing justifies us in excluding this thing from the category of material bodies. It can however also happen that there are other things that do have this property, but that nevertheless are not material bodies. The property in question is then one that is not part of the essence of a material body. But a property which is such that, if it is found in a thing, this thing must be regarded as a material body, then this property contains of necessity the essence of material bodies. For when a property is such that all things that share it must be regarded as material bodies, and if it is impossible that something having this property could not be considered a material body, then the essence of material bodies must be in that property. From this it is clear, that but a single such property constitutes the essence of material bodies, for if two or more such properties were required, then a thing that has only one of them, would not qualify to be regarded as a material body, which contradicts our initial premise. Therefore once we have discovered a single one of such properties, we can state with certainty that this property constitutes the essence of material bodies, whose complete understanding we have therefore achieved.

6. *All general properties of material bodies are founded in their essence, and one cannot ascribe to material bodies any general properties that are not contained in their essence.*

If a thing has the property that constitutes the essence of material bodies, then it is a material body, even if it has no other properties that have no connection with the former property. Therefore all properties that do not stem from the essence of the bodies, are not general properties of bodies, because material bodies would remain such even in their absence. Therefore material bodies cannot have general properties other than those arising from their essence. To him that has understood the essence of material bodies, no single general property of material bodies will remain hidden.

7. *All particular types of material bodies have their particular properties, which however are nothing but peculiar cases of the general properties.*

The concept of material bodies that we have so far considered, is a general concept that embraces all bodies, and that is therefore of necessity vague. Likewise are the essence of bodies and the properties that stem from the essence vague, and must be subjected to conditions and constraints from which the particular types of material bodies arise. Therefore when the essence of material bodies in general is subjected

to certain stipulations and constraints, one obtains the essence of a particular type of body, the properties of which arise from this constrained essence. These properties are distinguished from the general properties by nothing but the imposed restraints on the essence. If the essence is stipulated in its totality, there arises a single body, containing nothing indeterminate. Such a body is representative of all material bodies really existing as part of this world, since nothing can exist in reality that is not fully determined. Whilst the essence of material bodies in general is subject to few stipulations, the particular types of body, and the individual bodies belonging to each type, arise when the constraints placed on the essence are complete, so that nothing is left indeterminate.

8. *The best way for Natural Science to proceed is first to investigate the general properties ,that is to say the essence of material bodies, and subsequently to subject all particular types of bodies to a similar examination.*

The changes that occur in material bodies can only be understood in terms of their essence and of their properties, and the causes of these changes, if they are to be sought in the bodies themselves, must also come from the same source. But since the aim of Natural Science is to understand the causes of changes in material bodies, this aim can only be reached by diligent study of the general as well as the particular properties of bodies, in order to understand what changes bodies can undergo, and by what causes these changes can be brought about. Following this one must examine the causes of all particular changes occurring in material bodies.