

tific investigation the wider we discover to be the range of applicability of these laws, and the more the certainty rises in our mind that the whole Universe is governed by such laws. We have the right and the duty in seeking for explanations of new phenomena to apply those laws first which have verified themselves in other domains of knowledge, and see if they suffice for the case in hand before going further afield to look for other causes of the phenomena.

In the instances which I have just cited the law which was applied to explain new phenomena was one which had been verified in a particular case. But there are other cases where, to explain phenomena, a new law has to be postulated, which from the nature of the case, it is impossible to ever experimentally verify and yet about which, on account of the harmony it brings into the phenomena, we come to be as certain as we are about the law that bodies fall to the earth with a velocity which is proportional to the square of the time during which they have fallen. I shall mention two of these cases. The chemist Van t'Hoff was striving to account for the behaviour of certain sugars towards transmitted light. These substances occur in pairs, the members of which are identical in their composition as determined by analyses and in their behaviour to chemical reagents, but they differ in this, that, when a beam of light which has been previously polarized is passed through a solution of one, the plane of polarization of the light is deflected in a certain direction; and when a beam of similar light is passed through a solution of the other the plane of polarization is deflected in the opposite direction by a precisely similar amount. Van t'Hoff found that the atoms composing the molecule of each substance could be arranged in such a way that in each case there was a central atom of carbon with four atomic groups attached to it. These atomic groups could be arranged in two ways and in two ways only. If one assumed that they were attached to the central atom at equal distances from it and from each other they then occupied the angles of a regular tetrahedron and these two possible arrangements corresponded to each other