

utility of *experiment* as distinguished from mere passive observation. We make an experiment of the crucial kind when we form combinations, and put in action causes from which some particular one shall be deliberately excluded, and some other purposely admitted; and by the agreement or disagreement of the resulting phenomena with those of the class under examination, we decide our judgment.

(145.) When we would lay down general rules for guiding and facilitating our search, among a great mass of assembled facts, for their common cause, we must have regard to the characters of that relation which we intend by cause and effect. Now, these are,—

- 1st, Invariable connection, and, in particular, invariable antecedence of the cause and consequence of the effect, unless prevented by some counteracting cause. But it must be observed, that, in a great number of natural phenomena, the effect is produced gradually, while the cause often goes on increasing in intensity; so that the antecedence of the one and consequence of the other becomes difficult to trace, though it really exists. On the other hand, the effect often follows the cause so instantaneously, that the interval cannot be perceived. In consequence of this, it is sometimes difficult to decide, of two phenomena constantly accompanying one another, which is cause or which effect.
- 2d, Invariable negation of the effect with absence of the cause, unless some other cause be capable of producing the same effect.
- 3d, Increase or diminution of the effect, with the increased or diminished intensity of the cause, in cases which admit of increase and diminution.
- 4th, Proportionality of the effect to its cause in all cases of *direct unimpeded* action.
- 5th, Reversal of the effect with that of the cause.

(146.) From these characters we are led to the following observations, which may be considered as so