

stantly to the centre. It is thus that we are continually acquiring a knowledge of the existence of causes acting under circumstances of such concealment as effectually to prevent their direct discovery.

(143.) In general, we must observe that motion, wherever produced or changed, invariably points out the existence of *force* as its cause; and thus the forces of nature become known and measured by the motions they produce. Thus the *force* of magnetism becomes known by the deviation produced by iron in a compass needle, or by a needle leaping up to a magnet held over it, as certainly as by that adhesion to it, when in contact and at rest, which requires force to break the connection; and thus the currents produced in the surface of a quantity of quicksilver, electrified under a conducting fluid, have pointed out the existence and direction of forces of enormous intensity developed by the electric circuit, of which we should not otherwise have had the least suspicion.*

(144.) But when the cause of a phenomenon neither presents itself obviously on the consideration of the phenomenon itself, nor is as it were forced on our attention by a case of strong analogy, such as above described, we have then no resource but in a deliberate assemblage of all the parallel instances we can muster; that is, to the formation of a class of facts, having the phenomenon in question for a head of classification; and to a search among the individuals of this class for some other common points of agreement, among which the cause will of necessity be found. But if more than one cause should appear, we must then endeavor to find, or, if we cannot find, to *produce, new facts*, in which each of these in succession shall be wanting, while yet they agree in the general point in question. Here we find the use of what Bacon terms "*crucial instances*," which are phenomena brought forward to decide between two causes, each having the same analogies in its favor. And here, too, we perceive the

* Phil. Trans. 1824.