distinct statement of a mathematical law. The discovery of such laws is often remarkably facilitated by the contemplation of a class of phenomena to be noticed further on, under the head of Collective Instances (see § 194.), in which the nature of the mathematical expression in which the law sought is comprehended, is pointed out by the figure of some curve brought under inspection by a proper mode of experimenting.

(186.) After all, unless our induction embraces a series of cases which absolutely include the whole scale of variation of which the quantities in question admit, the mathematical expression so obtained cannot be depended upon as the true one, and if the scale actually embraced be small, the extension of laws so derived to extreme cases will in all probability be exceedingly fallacious. For example, air is an elastic fluid, and, as such, if enclosed in a confined space and squeezed, its bulk diminishes : now, from a great number of trials made in cases where the air has been compressed into a half, a third, &c., even as far as a fiftieth of its bulk, or less, it has been concluded that " the density of air is proportional to the compressing force," or the bulk it occupies *inversely* as that force; and when the air is rarefied by taking off part of its natural pressure, the same is found to be the case, within very extensive limits. Yet it is impossible that this should be, strictly or mathematically speaking, the true law; for, if it were so, there could be no limit to the condensation of air, while yet we have the strongest analogies to show that, long before it had reached any very enormous pitch, the air would be reduced into a liquid, and even, perhaps, if pressed yet more violently, into a solid form.

(187.) Laws thus derived, by the direct process of including in mathematical formulæ the results of a greater or less number of measurements, are called " empirical laws." A good example of such a law is that given by Dr. Young (Phil. Trans., 1826,) for the decrement of life, or the law of mortality. Empirical laws in this state are evidently *unverified inductions*, and are to be received and reasoned on with the utmost