

phes was rejected with some contempt and ridicule; and it was maintained, that the operation of the causes of geological change may properly and philosophically be held to have been uniform through all ages and periods. On this opinion, and the grounds on which it has been urged, we shall make a few concluding remarks.

It must be granted at once, to the advocates of this geological uniformity, that we are not arbitrarily to assume the existence of *catastrophes*. The degree of uniformity and continuity with which *terremotive* forces have acted, must be collected, not from any gratuitous hypothesis, but from the facts of the case. We must suppose the causes which have produced geological phenomena, to have been as similar to existing causes, and as dissimilar, as the effects teach us. We are to avoid all bias in favor of powers deviating in kind and degree from those which act at present; a bias which, Mr. Lyell asserts, has extensively prevailed among geologists.

But when Mr. Lyell goes further, and considers it a merit in a course of geological speculation that it *rejects* any difference between the intensity of existing and of past causes, we conceive that he errs no less than those whom he censures. “An *earnest and patient endeavor to reconcile* the former indication of change,”⁹ with *any* restricted class of causes,—a habit which he enjoins,—is not, we may suggest, the temper in which science ought to be pursued. The effects must themselves teach us the nature and intensity of the causes which have operated; and we are in danger of error, if we seek for slow and shun violent agencies further than the facts naturally direct us, no less than if we were parsimonious of time and prodigal of violence. *Time*, inexhaustible and ever accumulating his efficacy, can undoubtedly do much for the theorist in geology; but *Force*, whose limits we cannot measure, and whose nature we cannot fathom, is also a power never to be slighted: and to call in the one to protect us from the other, is equally presumptuous, to whichever of the two our superstition leans. To invoke *Time*, with ten thousand earthquakes, to overturn and set on edge a mountain-chain, should the phenomena indicate the change to have been sudden and not successive, would be ill excused by pleading the obligation of first appealing to known causes.¹⁰

⁹ Lyell, B. iv. c. i. p. 328, 4th ed.

¹⁰ [2nd Ed.] [I have, in the text, quoted the fourth edition of Mr. Lyell's *Principles*, in which he recommends “an earnest and patient endeavor to reconcile the former indications of change with the evidence of gradual mutation