

containing organic remains is underlaid by very thick buttresses of earlier sedimentary accumulations, whether sandstone, schist, or slate, which, though occasionally not more crystalline than the fossiliferous beds above them, have yet afforded no sign of former beings." "The hypothesis that all the earliest sediments have been so altered as to have obliterated the traces of any relics of former life which may have been entombed in them, is therefore opposed by examples of enormously thick and varied deposits beneath the lowest fossiliferous rocks, and in which, if animal remains had ever existed, some traces of them would certainly be detected." (*Siluria*, pp. 20, 21.) These facts ought, at least, to make us cautious how we assert the destruction of other life economies earlier than the Silurian.

6. *Metamorphism throws light upon the origin of the granitic rocks*, such as granite, syenite, and perhaps some varieties of porphyry. The prevailing opinion has been that they consist of melted volcanic matter, thrust into every crack in the overlying strata, and cooled and crystallized under great pressure and with extreme slowness. It is found also, that other rocks adjacent to the granitic have suffered mechanical displacement, and such chemical changes as heat only could produce.

Now all these statements are to some extent true, and they show the presence of a considerable amount of heat, and some mechanical action by the granitic rocks. But more careful examination shows that granite does not generally form the axis of mountains, nor do the stratified rocks dip away from them on opposite sides, but often the granite lies between the strata, and instead of having been the agent by which they have been lifted up, it has only partaken of the general movement which has resulted from some other and more general cause. Moreover, the heat requisite to keep granite in a melted state must be higher than it seems to have possessed; for Bischoff says he could not melt it perfectly in the most powerful blast furnace. Again, if it crystallized from such fusion, the quartz would be first consolidated, because least fusible; whereas it is found to have been the last. Granite, also, contains not a few hydrated minerals, or such as must have been produced in the wet way, and its own ingredients can hardly have had any other origin. If now we admit the foliated rocks to have been brought into a plastic state by the joint action of heat and