

chemical element deficient in the other and in sufficient quantity to influence the whole after-growth of the plant. As plants after once germinating are fixed to the same spot, it might have been anticipated that they would show the good effects of a change more plainly than do animals which continually wander about; and this apparently is the case. Life depending on, or consisting in, an incessant play of the most complex forces, it would appear that their action is in some way stimulated by slight changes in the circumstances to which each organism is exposed. All forces throughout nature, as Mr. Herbert Spencer⁸ remarks, tend towards an equilibrium, and for the life of each organism it is necessary that this tendency should be checked. These views and the foregoing facts probably throw light, on the one hand, on the good effects of crossing the breed, for the germ will be thus slightly modified or acted on by new forces; and on the other hand, on the evil effects of close interbreeding prolonged during many generations, during which the germ will be acted on by a male having almost identically the same constitution.

Sterility from Changed Conditions of Life.

I will now attempt to show that animals and plants, when removed from their natural conditions, are often rendered in some degree infertile or completely barren; and this occurs even when the conditions have not been greatly changed. This conclusion is not necessarily opposed to that at which we have just arrived, namely, that lesser changes of other kinds are advantageous to organic beings. Our present subject is of some importance, from having an intimate connection with the causes of variability. Indirectly it perhaps bears on the sterility of species when crossed: for as, on the one hand, slight changes in the conditions of life are favourable to plants and animals, and the crossing of varieties adds

⁸ Mr. Spencer has fully and ably discussed this whole subject in his 'Principles of Biology,' 1864, vol. ii. ch. x. In the first edition of my 'Origin of Species,' 1859, p. 267, I spoke of the good effects from slight changes in the conditions of life and

from cross-breeding, and of the evil effects from great changes in the conditions and from crossing widely distinct forms, as a series of facts "connected together by some common but unknown bond, which is essentially related to the principle of life.