

EFFECTS OF CULTURE ON VEGETATION.

THE effect produced by civilization on the feelings and intellect of the savage, the modifications induced in the characters of the lower animals by domestication, are not more wonderful than the changes which have been effected on many vegetable families, by the power of cultivation. Root, stem, leaf, flower, and fruit, are each naturally endowed with a certain degree of mutability, according to circumstances of soil, climate, and other external conditions; and man, practising upon this mutability, has, in course of time, succeeded in rearing products which bear scarcely any resemblance to their natural originals. There is a limit, no doubt, to this divergence from the normal type—a line beyond which organic adaptability cannot be forced, without interfering with the healthy existence of the organism; but of such a limit in vegetation, we are yet almost absolutely ignorant. All that can be said in the present state of our knowledge is, that certain results have been obtained, some of which we intend to notice as being at once highly curious and important.

In a state of nature, most vegetable tribes are limited to definite localities, these situations being characterized by some peculiarity of soil and atmospheric influence. If the conditions of soil and climate remain the same, the character of plants is nearly uniform and stationary; and this may be always said of them in their natural state. But if they be removed from a poor to a rich soil, from a warm to a cold climate, from a dry to a moist habitat, or *vice versa*, then their internal structure will undergo a change, and this change will manifest itself in one or other of their external characters. In some classes, the change is most evident in the roots and tubers; in others, in the stems and leaves; while in many, the flowers and fruit are the parts most affected. Sometimes change of situation produces merely a more luxuriant development of all the parts of a plant, without causing any abnormal growth of a particular organ, as may be seen every season, by comparing the crops on a poor gravelly soil with those on rich alluvium, or the produce of a neglected field, with that of a well-manured garden. Culture, in the widest sense of the word, may, therefore, be considered as the cause of these irregular changes which assume in plants a wonderful degree of permanency, and may be transmitted to successive races; though, generally speaking, if the artificial stimulus be not kept up plants will return to their normal or natural condition.

The changes which *roots* and *tubers* can be made to undergo are numerous, and highly beneficial to man. The potato, for example, is a native of tropical America, and when found wild, its tubers are not larger than a chestnut, and scarcely edible; while in Europe, it has been rendered, by

artificial treatment, one of the most valuable articles of human food. The produce of an acre of wild potatoes could be held in a single measure; while in Britain, the same area will yield from forty to sixty bolls. Cultivation has also produced innumerable varieties of this tuber, each varying in shape, size, colour, and quality; and this, it may be said, all within the last hundred years; for though the potato was imported from America, three centuries ago, it is scarcely one since it met with anything like attention. Beet, parsnip, and turnip, have been also wonderfully modified by culture, and made to break off into numerous varieties. The bulb of the latter, for instance, has, since the beginning of the present century, been metamorphosed from globular to fusiform in colours from white and yellow to purple and green, and in weight from a couple of ounces to more than twenty pounds. So also with the carrot, which, in a wild state, has a slender root of a yellowish-white colour, but which, under cultivation, swells out, and becomes succulent, assuming a deep red or orange colour. In the one case the root is not much thicker than a common quill; in the other it becomes as thick and long as a man's arm—the produce being sometimes as much as 400 bushels per acre. The cause of most of these changes is abundantly obvious. Cultivation removes a plant to a richer soil, where it can obtain all the elements essential to its growth with greater facility, and without suffering those impediments to continuous growth which alternate drenchings and droughts are so apt to occasion in a state of nature. If the soil be too wet, it undergoes drainage; if too dry, it is irrigated; besides being deepened and softened, to admit of the easy expansion of the bulb or tuber on every side. As in animals, so in plants, every individual has a tendency to reproduce its own qualities in its offspring, and man, taking advantage of this feature, rears only such species and hybrids as best suit his purpose, until, by successive developments, these qualities greatly exceed anything in nature, or even become altogether monstrous.

Stems, though less liable to metamorphoses of this kind, are still capable of being strangely changed from their normal condition. Every one is aware, that, if a tree which is a native of mountains, be planted in a valley, it grows more rapidly, but its timber becomes softer and less durable; and, in like manner, if the tree of a valley be removed to a mountain, it becomes of slow growth and stunted form, but produces timber remarkable for its toughness and durability. By cultivating upon this principle, tall stems are for the most part rendered short or dwarfish, and shorter ones taller—and dahlia, for example, having been reduced to one-half of its natural height by garden culture. The cabbage, in a wild state, has a tough, slender stem, which by culture has become fleshy and fusiform. There are no stalks and shoots to be found among the asparagus plants of the sea-shore, which can compare with those of