

form; and a still higher degree of variability when three distinct species, and most of all when four species, are blended together by successive crosses. Beyond this point Gärtner,⁴² on whose authority the foregoing statements are made, never succeeded in effecting a union; but Max Wichura⁴³ united six distinct species of willows into a single hybrid. The sex of the parent species affects in an inexplicable manner the degree of variability of hybrids; for Gärtner⁴⁴ repeatedly found that when a hybrid was used as a father and either one of the pure parent-species, or a third species, was used as the mother, the offspring were more variable than when the same hybrid was used as the mother, and either pure parent or the same third species as the father: thus seedlings from *Dianthus barbatus* crossed by the hybrid *D. chinensi-barbatus* were more variable than those raised from this latter hybrid fertilised by the pure *D. barbatus*. Max Wichura⁴⁵ insists strongly on an analogous result with his hybrid willows. Again Gärtner⁴⁶ asserts that the degree of variability sometimes differs in hybrids raised from reciprocal crosses between the same two species; and here the sole difference is, that the one species is first used as the father and then as the mother. On the whole we see that, independently of the appearance of new characters, the variability of successive crossed generations is extremely complex, partly from the offspring partaking unequally of the characters of the two parent-forms, and more especially from their unequal tendency to revert to such characters or to those of more ancient progenitors.

On the Manner and on the Period of Action of the Causes which induce Variability.—This is an extremely obscure subject, and we need here only consider, whether inherited variations are due to certain parts being acted on after they have been formed, or through the reproductive system being affected before their formation; and in the former case at what period of growth or development the effect is produced. We shall see in the two following chapters that various agencies, such as an abundant supply of food, exposure to a different climate, increased use or disuse of parts, &c., prolonged during several generations, certainly modify either the whole organisation or certain organs; and it is clear at least in the case of bud-variation that the action cannot have been through the reproductive system.

⁴² 'Bastarderzeugung,' s. 507, 516, 572.

⁴³ 'Die Bastardbefruchtung,' &c., 1865, s. 24.

⁴⁴ 'Bastarderzeugung,' s. 452, 507

⁴⁵ 'Die Bastardbefruchtung,' s. 56

⁴⁶ 'Bastarderzeugung,' s. 423.