flowers. Gärtner gradually increased the number of pollen grains until he succeeded in fertilising a Malva, and has[147] proved that many grains are first expended in the development, or, as he expresses it, in the satiation, of the pistil and ovarium. Again, when one plant is fertilised by a widely distinct species, it often happens that the ovarium is fully and quickly developed without any seeds being formed; or the coats of the seeds are formed without any embryo being developed within. Prof. Hildebrand, also, has lately shown[148] that, in the normal fertilisation of several Orchideæ, the action of the plant's own pollen is necessary for the development of the ovarium; and that this development takes place not only long before the pollen-tubes have reached the ovules, but even before the placentæ and ovules have been formed; so that with these orchids the pollen acts directly on the ovarium. On the other hand, we must not overrate the efficacy of pollen in the case of hybridised plants, for an embryo may be formed and its influence excite the surrounding tissues of the mother-plant, and then perish at a very early age and be thus overlooked. Again, it is well known that with many plants the ovarium may be fully developed, though pollen be wholly excluded. Lastly, Mr. Smith, the late Curator at Kew (as I hear through Dr. Hooker), observed with an orchid, the *Bonatea speciosa*, the singular fact that the development of the ovarium could be effected by the mechanical irritation of the stigma. Nevertheless, from the number of the pollen-grains expended "in the satiation of the ovarium and pistil,"—from the generality of the formation of the ovarium and seed-coats in hybridised plants which produce no seeds,—and from Dr. Hildebrand's observations on orchids, we may admit that in most cases the swelling of the ovarium, and the formation of the seed-coats are at least aided, if not wholly caused, by the direct action of the pollen, independently of the intervention of the fertilised germ. Therefore, in the previously given cases we have only to

[149] 'Beiträge zur Kenntniss der Befruchtung,' 1844, s. 347–351.

[150] 'Die Fruchtbildung der Orchideen, ein Beweis für die doppelte Wirkung des Pollens,' 'Botanische Zeitung,' No. 44 et seq., Oct. 30, 1865 and Aug. 4, 1865, s. 249.