

vitality. In this he was assisted by Sir Joseph Hooker, and the Rev. M. J. Berkeley conducted a similar set of experiments, the results of which first appeared separately in the *Gardener's Chronicle*, afterwards jointly with Darwin's in the *Journal of the Linnean Society*. The principal fact ascertained from these experiments was that the seeds of many plants belonging to the most widely different natural orders germinated after long immersion in sea-water—some after upwards of 100 days; and these were not by any means all seeds of plants which naturally inhabit the sea-shore or salt marshes; yet among them were *Atriplex*, *Beta*, *Spinacia*, and *Rheum*. A species of *Capsicum* endured the trial best, thirty seeds out of fifty-six having germinated well after 137 days' immersion. But Darwin was led to believe from these experiments that he had previously over-estimated the action of the sea on the dispersion of plants, for he says:—"I soon became aware that most seeds, in accordance with the common experience of gardeners, sink in water; at least I have found this to be the case, after a few days, with the fifty-one kinds of seeds which I have myself tried; so that such seeds could not possibly be transported by sea-currents beyond a very short distance. Some few seeds, however, do float, as I have tried with some of those cast by the Gulf Stream on the coast of Norway. From knowing that timber is often cast on the shores of oceanic islands, far from the mainland, and from having met with accounts of floating vegetable rubbish off estuaries, I assumed that plants, with ripe seeds, washed into the sea by rivers, landslips, &c., might be drifted by sea-currents during a period of some weeks. The closing of capsules, of pods, and of the heads of *Compositæ*, &c., when wetted, and their re-opening when cast on shore and dried, the seeds being thus allowed to be driven inland by the first stormy winds, seemed to favour such means of transport. But in putting thirty-four plants of different orders, with ripe fruit, into salt water, one alone (*Euonymus*) floated a month, being buoyed up by its fruit; the others all sank in twenty-one days, some in five, and several in seven, nine, and eleven days. But I am not sure that I have made the trial fairly, for I kept the floating plants in too warm and dark a place, which might have favoured their decay."

Of course, Darwin's experiments proved nothing of any plants not tried, and not everything bearing on the question of those that were tried. Thus, the seed-vessels, enclosing seeds, of some of them might float, though on looking through the list very few of the species are such as are likely to be conveyed from place to place by the sea, except under extraordinary circumstances. Subsequently Darwin made some more experiments, and he found that many things which sank when green, or floated only a short time, floated a long time when dry.<sup>1</sup> Thus, ripe hazel-nuts sank immediately, but when dried they floated for ninety days, and afterwards when planted they germinated. An asparagus plant with ripe berries floated for twenty-three, when dried it floated for eighty-five days, and the seeds afterwards germinated. Ripe seeds of *Helosciadium* sank in two

<sup>1</sup> *Origin of Species*, p. 359.