

SEED DISPERSAL

A Thesis Presented For  
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by

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The dispersal of <sup>man</sup> plants by means of seeds and fruits, has been a subject of study and has been dealt with at length by many botanists from the time of Darwin to the present. In most parts of the world observations have been made in the field on plants growing under natural conditions; in the universities the causes and physiology of the various adaptations have been studied; and at the farms of the agricultural colleges extensive experiments have been carried on. The reason for so much attention lies in the interest of the subject from both the theoretical and the practical sides of science. Its bearing on the evolution of plant life and on the relation of the flora of different regions has given it great theoretical importance, while its relation to the agricultural industries has led to careful study of the means of dissemination of all these plants which are weeds in any country, with a view to their prevention or eradication.

Examples of the rapid spread of plants injurious to human industry are numerous. Darwin says of the cardoon, *Cynara cardunculus*, in Argentina; "Very many, probably several hundred, square miles are covered by one mass of these prickly plants and are unpenetrable by man and beast. Over the undulating plains where these beds occur nothing else can now live. Before their introduction, however, the surface must have supported as in other parts, a rank herbage." (1) Almost equally striking has been the spread of the Russian Thistle, *Salsola Tragus*, in parts of the States of North and South Dakota.

In this account of Seed Dispersal an attempt will be made to review the various general methods by which dispersal is accomplished, with reference to plants which exemplify

(1) Darwin, Journal of Researches, Chap. VI.

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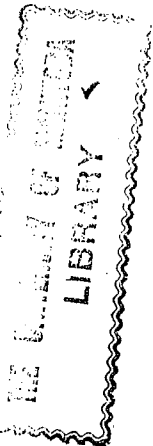
THE DISPERSAL OF SEEDS.

The dispersal of seeds, or rather the dispersal of plants by means of seeds and fruits, has received careful study and has been dealt with at length by many botanists from the time of Darwin to the present. In most parts of the world observations have been made in the field on plants growing under natural conditions; in the universities the causes and physiology of the various adaptations have been studied; and at the farms of the agricultural colleges extensive experiments have been carried on. The reason for so much attention lies in the interest of the subject from both the theoretical and the practical sides of science. Its bearing on the evolution of plant life and on the relation of the flora of different regions has given it great theoretical importance, while its relation to the agricultural industries has led to careful study of the means of dissemination of all those plants which are weeds in any country, with a view to their prevention or eradication.

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attached to the feet and legs of birds, and there seeds for-  
 animals moving about in wet weather, or feeding or watering  
 seeds will be contained in the earth adhering to the feet of  
 will be carried for distances, greater or less. Still more  
 plants and entangle light seeds in their coats so that they  
 jury to the least protected. Animals may brush against  
 to roll many seeds over considerable distances, without in-  
 wash them to the lower levels, even a small shower sufficing  
 the least unequal will have the rains and melting snow to  
 the strength of the wind. Such plants as grow on ground in  
 whose seeds depends of the height of the plant, and  
 which detaching them by shaking the plant and then over a  
 of their numerous seeds is obtained by means of the wind  
 tions to secure dispersal. A reasonably wide scattering  
 are examples of prevalent types without special modifica-  
 among the composites, and many others in various families  
 the Umbelliferae, the Acheneae of Helianthus and Lophilis  
 Caryophyllaceae, the Moxitoxis of Ritis and Cirsium, among  
 Podiaceae and Amarantaceae, the seeds of Portulacaceae and  
 most of the Orobanchaceae, the small utricles of the Chenop-  
 species of Rosae and Ranunculidae among Grasses, the seeds of  
 even to spread the species such forms as the grains of many  
 opportunity to grow in sufficient numbers to perpetuate and  
 lightness of them to secure from ordinary conditions an  
 pend upon the number of seeds produced and often upon the  
 seeds or fruit for securing a wide distribution. These de-  
 Many plants have no special adaptation of their  
 tions.  
 characteristic plants of this region to meet those condi-  
 ing in western Canada and the means chiefly employed by the  
 those methods, and then to consider the conditions prevail-

- (4) W. J. Bell, Seed dispersal, Chap. IV.
- (3) Darwin, Origin of Species, Chap. XII.
- (2) Origin of Species, Chap. XII.

Plants, by means of which the seeds are floated to all parts  
 of the globe. Corky coverings are found in the fruits of Almonds and  
 are provided from maturity with corky coverings or air-filled  
 reservoirs for dispersal adopted by various berries. Other seeds  
 of into balls light enough to float. (4) This is a secondary  
 grapes which have adhered to the vines until spring are wrinkled  
 ed, as is seen in the case of the wild grape where the low  
 wrinkled skin of the dried up fruit in which they were enclosed  
 it often will be floated for a long time by the withered and  
 other parts to this. Many seeds which sink in water at once,  
 outer coat of the seed or fruit and upon the attachment of  
 will depend largely upon the thickness and structure of the  
 Both flotation and resistance to injury by immersion

others. (2)

were often assisted by their remaining attached to dried bran-  
 He also found that their power of flotation varied greatly and  
 eight to one hundred and thirty-seven days and still continue.  
 bear immersion in salt water for periods varying from twenty-  
 by water. Darwin found that a large number of seeds could  
 jury to them by soaking, thus providing for their dispersal  
 viding for the flotation of fruits and the preventing of in-  
 dispersal. Of these provisions the simplest are those pro-  
 But many plants have made some special provision for

sal of seeds that are not of very large size.  
 special adaptations there is a fair chance for the disper-  
 as French weed, *Thlaspi arvense*. Thus even without any  
 fection of cultivated fields with the seeds of such weeds  
 and other animals, and this is a frequent source of the in-  
 lumps of earth adhering to the hoofs and legs of cattle  
 great numbers of seeds would thus be carried in the large  
 the leg of a wounded bird yielded eighty-two plants. (2)