

late these laws, and remain the slaves of prejudices which are opposed to them, we can only bring upon ourselves disappointment. The scientific teacher of agriculture occupies a most important position, bringing into their proper relations theory and practice, and harmonising into one body facts and principles drawn from several distinct sciences all bearing on the business of the farmer; but what he undertakes to expound is not so much a separate science, having principles of its own, as a combination of scientific truths belonging to Natural History, Geology, Chemistry, Meteorology, Mechanics, brought together in their proper places and proportions, compared with the results of experience and applied to the direction of practice. This is not a low view of what is to be accomplished by the agricultural profession—it is the highest—and it does justice to the varied and extensive acquirements demanded from him and the great difficulties which he must have overcome in his noble undertaking, to make science useful in one of the most important of human employments where it is greatly needed, and yet there are many obstacles to its efficient application. It is interesting to observe how large a portion of agricultural science consists in applications of animal and vegetable physiology. Why does the farmer weed his field? Because the space and nutriment it affords are all needed to bring to perfection its valuable products, which must be choked or starved, if worthless articles are allowed to intrude. Why, if attentive and judicious, does he exert himself to remove the weeds in due season, and from the paths and waysides as well as from the occupied ground? Because he knows the importance of anticipating the scattering of the seed, having some idea of the rate of increase of ordinary herbs, and as he intends to make his land clean so as to lessen his trouble from year to year, he feels the necessity of looking well to prevent sources of a fresh stock of weeds from escaping notice in dry places where they are passed by the thoughtlessness of no consequence. Why does the judicious farmer carefully study the proportion of seed which he employs to a given extent of land for his various crops, weighing the evidence from reason and experience in favor of the different practices? He desires to obtain from his land the greatest amount of produce which it will yield, and he has to judge between a greater number of plants, each of which has full room for development. The practical point is to decide how many plants of the kind required can come to full perfection on a given space, so that all the available nutriment may be employed under this name set in three different ways. Some of them alter the texture of the soil so as better to adapt it to particular crops, or to make it more manageable for the various processes of culture. Others are chiefly useful by acting upon matters already contained in the soil so as to set free a useful supply of nutriment which would not have been immediately available—whilst others again directly furnish the requisite supplies of food to the crops, and of these some immediately produce all the effect of which they are capable, whilst others

yield their supplies gradually, their effect enduring for a considerable period. The intelligent cultivator applies nothing to the soil without having a good idea what he wants and in what way the desired effect is likely to be produced. He knows that if the soil be clean and open, it rapidly absorbs nutriment from the atmosphere—he knows that his crops all take away some portion of the nutriment contained in the soil; that each different kind makes to a certain degree a different selection, whence the advantage of a succession of crops—and that, although in fresh soils, these peculiarly abounding in the materials by which vegetable life is supported, successive crops may for a time be taken with apparent success, or scarcely perceptible annual deterioration: yet, as each crop actually withdraws a certain amount of important matter from the soil, the idea of inexhaustible fertility is absurd, and it is only when we find the means of cheaply restoring each year what is taken away, that we have a permanently profitable system of cultivation. This is the plain teaching of the success of vegetable physiology—it is conformable with good sense and experience, and it is not without surprise that we read of a neighbouring country remarkable for its extraordinary natural fertility, in which the annual yield of the wheat crops is rapidly diminishing, in consequence it is to be presumed, of entire neglect in restoring anything to the ground. We have here a fresh and fertile region. It is to be hoped we shall act more wisely than to exhaust its powers whilst we daily waste the means of restoring them, thus driving ourselves to the necessity of the constant occupation of fresh land in order simply to maintain our present productive power, which it is our desire and our interest to increase. I might go through in the same way every point of agriculture, horticulture, and arboriculture, showing that every rule is founded on notions supposed to be correct of the structure, mode of life, and nutrition of plants, and that every improvement depends on more correct knowledge in these departments, or a more careful application of what is known. For some of the important facts to be ascertained, we depend on the science of chemistry, the facilities afforded by which are of the utmost value, but in this instance it only brings its resources to the aid of vegetable physiology, which really supplies the whole scientific laws of this grand department of agriculture, and if we turn to that other great department which relates to the keeping of stock of all kinds both for the supply of food and for assistance in labor, it will be found that here also the rational principles which guide the practice of the skillful farmer belong to the science of natural history, and that it is from that study of animal physiology and from diffused knowledge of its established principles that we must chiefly hope for the improvements which are to be expected and derived. The whole theory of feeding and fattening, and of preserving the desirable qualities of individuals in breeding is drawn from animal physiology, and when we review the great improvement made of late years in the management of all kinds of stock, which we know to have directly arisen from theoretical