THURSDAY, SEPTEMBER 12, 1872

THE POTATO DISEASE

THERE seems little doubt that the present season will prove one of the most unfavourable within this generation as regards the yield of the fruits of the earth. The steady rise in the price of corn indicates a widely-spread fear that the harvest will turn out to be considerably below the average, both in quantity and quality. The crop of fruits of nearly every kind may be described as all but a complete failure. The potatoes are estimated as irredeemably bad, to the extent of three-fourths of the yield. Hops are in many parts scarcely worth the pulling. The grass and root-crops have alone benefited by the wet and ungenial summer. The cattle are, moreover, suffering from the foot-and-mouth disease on almost every farm in some counties, and we hear of the outbreak of rinderpest in Yorkshire.

In this dismal list the palm of failure must be given to the potato, with the exception, perhaps, of the apple crop, which has been destroyed by causes not affecting the health of the tree. It is generally admitted that the potato crop is, taken as a whole, the worst since 1845 or 1846. The cause of failure is the same—one, in fact, that has been more or less in existence ever since—the attack of a parasitic fungus, *Botrytis* or *Peronospora infestans*, peculiar to plants belonging to the same natural order as the potato, and unknown before 1845, or some say 1842. The mycelium of this fungus eats into and completely destroys the tissue of the leaf and stem, and when once its ravages have commenced it is almost impossible to arrest them. When the disease made its first great onslaught in 1845, innumerable remedies were suggested, some of which have again cropped up during the present season. Unfortunately, no sooner does one experimenter announce in the *Times* a mode which he has found effective of preventing or arresting the disease, than another grower replies that he has tried the same plan, and with him it has utterly failed. The exact mode of action of the parasite, and the operation of the proposed remedies, we intend glancing at on another occasion. It is satisfactory, at all events, that Dr. Hooker has given in public the weight of his authority in favour of the statement that the starch of the potato is not affected by the complaint, if only some economical mode can be found of separating it from the diseased ingredients. This is some alleviation of a calamity which, according to a statement in the *Times*, threatens the country with a loss of between twenty and thirty millions sterling.

The point to which we specially desire to call attention at the present time, is the enormous material loss which the country is now suffering, and has suffered year after year, from causes which are unquestionably within the range of scientific means to prevent, or at all events materially to alleviate. We are satisfied that we are within the mark when we say that the increased expenditure in most middle-class families within the past eight years, caused by the enhanced price of butchers' meat, milk, and potatoes, represents an income-tax of from a shilling to eighteen-pence in the pound. A portion of this rise is no doubt due to increased consumption, caused by the general prosperity of the country; but the greater part is owing to the prevalence of epidemic diseases in our crops and our herds. Surely Science can find no worthier object than in an earnest attempt to find a remedy for this. And yet what is English Science doing? It was cogently asked a few days since in the *Times*:—"What are we doing, or what have we done, to obviate the recurrence of a disease which is always impending? Probably all we can remember is that there is always a talk of the potato rot, and that some years it has been worse than others. We can only say that this is a disgraceful confession. There is no matter in which Science could interfere with more advantage; and we seem to have all the conditions of the subject under control." We fear that the rebuke here given to English Science is not wholly undeserved.

This brings us to the question which has so often been debated in these columns:—Where are we to find the proper individual or body to start and to carry on scientific investigations of this nature—in private individuals, in societies like the Agricultural or the Horticultural Society, or in the Government? Few will probably contend in favour of the first alternative. Individuals, no doubt, have been found, and will be found, to spend their lives and lavish their fortunes in investigations in which they have no or only a remote pecuniary interest. But it is surely unwise in the extreme to subject our national prosperity to the hazard of private generosity. The societies we have named, and others of a more local character, such as the Highland Society, have done eminent service in promoting sounder views and practices in agriculture and horticulture; but it is questionable whether inquiries of this nature are not beyond their scope, or whether any conclusions at which they might arrive would obtain the universal acceptance which would be desirable. We are, therefore, driven once more to the third alternative; and compelled to inquire whether we have not a right to look to the Government of the country to "interfere" in the matter, as Mr. Gladstone would term it, that is to institute and to promote an investigation into the Origin, Cause, and Remedies for the Potato Disease.

Little objection can be anticipated to the course we advocate on the ground of the money value at stake in the question. We are at the present time spending a large sum of money and employing the highest talent in the country in the settlement of a claim for a few millions; to save the country several times as much per annum cannot be objected to as a matter unworthy the attention of our rulers. And yet, because the one infliction will fall upon us in the form of an additional twopence to our Income-tax for a single year, the other in the form of a much heavier addition to our butchers' and greengrocers' bills for many years in succession, we are content in the latter case to grumble and bear it, without making any serious efforts to relieve ourselves from it. Science is often charged with being "unpractical;" indeed, in the minds of perhaps the majority of people there is a kind of hazy feeling of a necessary antagonism between what is scientific and what is practical. It is time for Science to redeem herself from this imputation, and no better opportunity could be found

than in discovering a remedy for the Potato Disease. The questions which would present themselves for solution in such an inquiry are numerous. It would not be difficult to collect the facts; but they have never yet been tabulated or presented to the public in such a form that any conclusions can be drawn unquestionably from them. A competent authority on these subjects, the *Gardener's Chronicle*, recently remarked:—"Though for nearly a quarter of a century, more or less, cultivators have had to wince under the losses inflicted by the enemy, they have not yet learnt either the mode of invasion or the method of destruction." The Commission would have to inquire whether the disease is most prevalent on any particular soil; whether, as some assert, seed left in the ground through the winter enjoys comparative immunity as contrasted with that sown in the spring; whether seed introduced from a distance is safer than that grown in the neighbourhood; whether old varieties are dying out and new ones comparatively healthy; whether, if the disease can by any means be warded off till August 10, the crop is then comparatively safe, and very many others, on which every diversity of opinion exists at present? On one point almost all authorities are agreed, viz., that the disease generally makes its first decided appearance during thundery weather. The exceptional amount of electrical disturbance which extended over almost the whole country during July of the present year appears to have been most unfavourable to the potato crop; while a clergyman, writing from a district where thunderstorms are remarkably rare, in the portion of the county of Devon to the south of Dartmoor, averaging about six in twelve years, states that it is there almost free from disease.

It is worthy of note that an unusual development of the potato blight has been hitherto accompanied by murrain or epidemic diseases in animals and in other crops, and that a certain periodicity appears to be manifested. The present year has witnessed the most virulent outbreak since 1846; the worst of the intermediate years were nearly midway, from 1859 to 1861, showing an approximate recurring interval of about twelve years. A writer in the *Gardener's Chronicle* thus describes the crops in the latter year:—"My potatoes are in as bad a state as I ever remember to have seen them; my turnips are rapidly rotting, and many are filled with a semi-fluid offensive matter; the lettuces in various parts of the kitchen-garden are nearly all rotten; the roots are found generally diseased; the cabbages, savoys, and others of the *Brassica* are what gardeners term blind; the beans are spoiled by the black fly; the peas are all more or less blighted or mildewed; many of the plum and cherry trees are destroyed; I never witnessed anything more lamentable and disheartening." Other accounts agree in the main with this, at least as regards the potatoes in that year. Now, it is very remarkable that an interval of from eleven to twelve years coincides with the period of maximum sun-spots. The present time is near the maximum of sun-spots, so was 1860, so was 1848, the curve showing but little decline for one or two years on each side of the actual maximum. Now, if it can be shown that epidemics like the potato blight are connected with great cosmical cycles, an important step is gained. Physicists are now nearly of accord that a connection exists between the sun-spot period and the recurrence of electrical and other disturbances in the earth's atmosphere. It may be urged that such a conclusion as this would make cure hopeless, and paralyse, instead of stimulating, energy, by inducing a kind of hopeless fatalism. Not at all. An evil which cannot be avoided may, nevertheless, be greatly mitigated by scientific knowledge and skill. To be forewarned is to be forearmed, and a knowledge of the cause of a disease is already halfway towards its cure. If we were certain that in another twelve years we should be liable to a recurrence of the blight with unusual severity, the farmers might be persuaded to plant only so much as would be likely to yield seed for the next year, and that only under the most favourable circumstances, where comparative immunity might be predicted; and large breadths might be devoted to turnips, beet, or other root-crops which experience showed to be likely to yield good results, and which would furnish some substitute for the lost potato.

We have endeavoured to sketch out only a few of the questions which would present themselves for solution were we in earnest to institute a thorough scientific investigation of the cause and cure of the potato blight, and to point out that few subjects are more worthy the attention of a commercial and practical nation.

SHARPE & DRESSER'S BIRDS OF EUROPE

The Birds of Europe. By R. B. Sharpe and H. E. Dresser. Parts xi. and xii. (Published privately.)

THE completion of the first volume of this important work by the issue of Parts xi. and xii., affords the authors an opportunity of expressing their determination to continue the monthly issue with as much punctuality as is compatible with the fulness and accuracy at which they aim. This volume has occupied eighteen months in its publication; but as it contains 101 coloured plates and about 800 or 900 pages of letterpress of large quarto size, the wonder is rather that so near an approach to regularity has been attained in a work which is taking so much larger dimensions than was at first anticipated.

The present parts show no lack of the energy and care hitherto exhibited. In addition to the seventeen species figured and copiously described, we have three additional plates with eight figures of the Sparrow Hawk in various states of plumage, and two others with additional figures of the Ring Ouzel and the Rock Thrush. As an example of the great care bestowed by the authors in the accumulation and critical comparison of specimens from all parts of Europe, and from other quarters of the world where necessary, we may state that the present part discriminates between several birds that have hitherto been confounded, and thus adds two species to the list of European birds, and one to that of Britain. A fine Woodpecker (*Picus lilfordi*), found in Greece and Turkey, has been separated from *Picus leuconotus* which inhabits the more northern parts of Europe; while the British form of the Cole Tit (*Parus ater*) is found to be so constantly different from that which inhabits the Continent as to require a distinct specific name, and it has accordingly been called *Parus brittanicus*. To illustrate these minute specific differences the excellent plan is adopted of giving figures of the allied species on the same plate.