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THE
POTATO PLAGUE
IN IRELAND

1890



BY
JAMES MACDONALD

WILLIAM BLACKWOOD AND SONS
EDINBURGH AND LONDON
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THE
POTATO PLAGUE IN IRELAND
1890

BEING
A SERIES OF LETTERS CONTRIBUTED TO
'THE SCOTSMAN'
GIVING THE RESULTS OF AN EXHAUSTIVE INVESTIGATION
INTO THE EXTENT OF THE POTATO PLAGUE
IN IRELAND IN 1890

BY
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OF THE 'FARMING WORLD'

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NEW EDITION OF STEPHENS' 'BOOK
OF THE FARM,' ETC., ETC.

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PREFATORY NOTE.

IN the succeeding article, reprinted from the 'Scotsman' of the 9th October 1890, the Editor of that journal has fully explained the objects and scope of the investigation which, by his desire, I undertook. When writing the dozen letters which record the results of that investigation, and which make up this pamphlet, I had no thought that they would occupy any other form than that for which they were originally intended. They were of set purpose limited in their scope. They deal chiefly with the extent and character of the "Potato Plague"; its probable effect upon the condition of the poor people in the congested districts; and the untoward influences which are mainly responsible for its occurrence. Only incidentally has any reference been made to remedial measures, for that phase of the subject lies beyond the objects of the inquiry.

Thus, feeling that my letters merely, as it were, touched the fringe of a great national question, I was reluctant to believe that they were worthy of republication in a permanent form. Requests for this, however, have come so persistently, and from so many men of

influence who have at heart the enduring interests of the small farmers of Ireland, that I now readily assent to the desire.

It is thought that the immediate objects will be best served by the republishing of the letters exactly as they originally appeared, and by themselves. One might naturally feel inclined to enter upon the great question of how the recurrence of distress through the failure of the potato crop on the small farms of Ireland might be most effectually prevented. Obviously, however, this cannot be done in a Prefatory Note.

I have to thank the proprietors of the 'Scotsman' for their consent, readily given, to republish the letters.

It is perhaps well to explain that, where not otherwise stated, it is the statute not the Irish acre that is meant.

JAMES MACDONALD.

EDINBURGH, *Nov.* 1890.

OBJECT OF THE INQUIRY.

(From an Editorial Article in the 'SCOTSMAN' of October 9, 1890.)

THIS morning we publish the first of a series of letters by our Special Agricultural Commissioner on the Potato Disease, or, as he calls it, the Potato Plague, in Ireland. The accounts that have come to this country as to the extent and character of the disease that has afflicted potatoes in Ireland have been so numerous and so diverse, that it has been extremely difficult to discover what is and what is not the truth of the matter. On the one hand, there has been talk of dire famine; on the other, the disease has been spoken of as of little importance. An American Committee, apparently guided mainly by electioneering motives, but trading principally upon the generous sentiments of the people, have proclaimed that Ireland is threatened with a dreadful famine. The same sort of talk is heard from the National Leaguers; though, with all their courage, they scarcely venture to go so far as the American Committee have gone. Obviously, it is most desirable that the exact state of the facts should be known; and it is in order that they may be known that we have sent to Ireland a Special Commissioner, with instructions to inquire faithfully and impartially into the extent and nature of the disease.

The trustworthiness of the Commissioner and his ability will not be called in question by any one who knows him. In 1877 he did most excellent work for the British public in letters which he wrote from America in reference to the cattle trade there. He had been sent out by us to inquire into the

question, which at that time was of enormous interest to the cattle breeders and feeders in this country ; and he wrote a series of letters, of which it is not too much to say that they formed the basis of much of the future action of Scottish farmers. He is one of the best known authorities on agriculture in this country. He has received several prizes from the Highland and Agricultural Society for essays and descriptive papers which he has written, and he is editing the new edition of Stephens' 'Book of the Farm.' As a matter of fact, we are entirely ignorant as to what are his views of the political question in Ireland. It is enough for us to know that he is intimately acquainted with agricultural subjects, a most competent authority on these subjects—perhaps the most competent authority that could have been secured—and that he is in all respects trustworthy. What the result of his inquiry will be remains to be seen. His letters will be published as he writes them ; that is to say, every fact he states and every experience he describes will be given as he puts them down. It is hoped that in this way the public will receive information upon which it can implicitly rely as to the potato disease in Ireland, the extent of country over which that disease exists, and the amount of injury that it has done or is likely to do.

It has been thought desirable to say thus much of the letters which are to be published, because of their real importance, and because it is necessary that accurate information upon the state of agricultural matters in Ireland should be put before the public. The public will know that the author of the letters is competent and trustworthy, and it cannot but be that what he writes will have great weight and interest for those who desire to know the facts.

THE POTATO PLAGUE IN IRELAND.

I. WEST CORK.

“WELL, before you start, I have only one thing to say. I want you to tell us the truth—the bare, absolute facts, untainted in any way with political feeling. You will conduct the investigation as you think best, and satisfy yourself as to the actual state of matters. I want you to understand that we shall rely implicitly on what you say.” In pursuance of these editorial directions, the “Special Commissioner” enters upon the investigation with the sole object of acquainting himself with “the bare, absolute facts,” and of stating them for publication, so that others may draw such conclusions as may seem to be warranted.

In the practical work of this inquiry, a beginning was made in the county of Cork. Attention was in the first place directed chiefly to West Cork, which is understood to be one of the most severely disease-stricken parts of the country. In the journey from Cork to Skibbereen, one passes over great diversity of soil and surface. Near the beautiful city of Cork the country undulates abruptly, is conveniently laid off into farms of moderate size, and, comparatively speaking, would seem to be fairly well farmed. Weeds are kept a little more in subjection than in many similar parts of Ireland, and one can readily see that the fertile soil is made to yield, if not its full increase, at least a very large measure of it. The cereal and hay crops have been well saved. These

are, on the whole, fairly good, and the roots promise more than an average yield. Yellow turnips predominate, but mangels grow admirably in this part of the country, and are raised to a considerable extent.

The potato-fields present a curious appearance. Only a very small portion of the crop has as yet been dug. The tops have almost entirely disappeared, and the drills and lazy-beds—the latter predominate—are now closely covered with coarse weeds. In these circumstances there is only one way of judging of the condition and character of the crop, and that is to have the tubers dug out for inspection. It will thus be readily understood that this investigation has been rather a slow process—somewhat akin, in fact, to a tour of mine-prospecting. Most willing have been the farmers, big and little, to go and dig out the treasures of their potato-plots; and if the appearance and numbers of these did not always quite tally with the tolerably abundant preliminary remarks, there were always at hand very ample explanations to account for the discrepancies. “Why, sur, I dug here for hours yesterday, and I could not get what would breakfast my family; and these, sur, although they may not look diseased, are full of water inside when boiled. Indeed, sur, thim are not fit to ate.” It was a poor crop certainly, but by no means an absolute failure—a little over two and a half tons per acre I should say, and only about one in six or seven in the slightest touched with the disease. But the tubers as a rule were small, at least one-half of them not half the usual size. It was easily seen that the crop had been early checked in its growth; for although the great majority of the tubers were quite sound—that is, quite free from actual disease—they were very far from being properly matured.

“When did the disease appear, sur, did you say? Why, it seemed just to come up with the taters, for the tops got black just as they got green!” Obviously enough it was early in the season that the mischief was done here—early in summer, when the weather was wet and cold, and altogether most unfavourable for healthy potato growth. The weather lately has been delightfully fine, dry, warm, and breezy, with a great deal of strong sunshine—just the kind of weather that is detested by the whole tribe of vegetable fungi. And so in this inland

valley in West Cork the *Peronospora infestans* has lain a vanquished invader for probably a month or more. What he has left unblasted can never be much more than half an average crop, and that of an inferior quality. This would most probably be the general verdict in inland parts here, and as we push on towards Skibbereen we find that the condition of the crop becomes worse.

The disease has this year been most virulent around the sea-coast. It is generally understood that the poor, rocky country which lies between Skibbereen and the sea, and along the coast here for many miles, has suffered about as badly as any part of Ireland. It was therefore decided that it should be explored as thoroughly as possible. A "poor, rocky country" this assuredly is. Bare rocks rise up in irregular masses all around, hiding the many patches of arable land which the inhabitants have contrived to form in the little ill-shaped hollows. Such heather as grows is short and stunted, and the rough pasture is of a very poor description. Soil is the great want. The climate is exceptionally favourable for the growth of most farm crops. There is little snow or frost, but a great deal of rain. Mangels and turnips grow very well indeed. On little patches of ground, usually egg-shaped, often not more than 15 to 20 yards long and one-third as broad, and hedged in by bare or heather-clad rocks, we have seen here crops of globe mangels that would not discredit a well-managed farm in the southern counties of England. The tillage work is done almost entirely by hand labour; and it is a pleasure to say that, on the whole, the little holdings we saw in this district are worked with care and thoroughness which larger farmers in much better farmed parts of Ireland might copy with no small advantage. Occasionally, indeed, we came upon a holding that was a treat to see, with every square yard that would carry a crop of any kind contributing its full quota to the support of the by no means small family which the holding had to maintain. On the other hand, the "whole truth" would not be told unless it were stated that the small farmers on the rocky heights of West Cork are not all model farmers, any more than are all the large farmers in the golden vale of Tipperary.

In the Union of Skibbereen there are in all 3026 holdings

—144 not exceeding 1 acre, 149 above 1 and not exceeding 5 acres, 491 above 5 and not exceeding 15 acres, 816 above 15 and not exceeding 30 acres, 766 above 30 and not exceeding 50 acres, 519 above 50 and not exceeding 100 acres, and only 141 over 100 acres in extent. Amongst these there were last year only 21,511 acres under “crops, including meadow and clover”—an average of about 7 acres, with natural grass extending to nearly 64,000 acres. The predominant position which the potato crop holds on the small farms in Ireland is well shown by this Union. Last year there were here 4996 acres of potatoes, while all the other kinds of crops (exclusive of grass) put together extended to only 8457 acres. Potatoes and oats occupy nearly equal areas; wheat about 1400 acres, turnips 1500 acres, and mangels 500 acres. The oats grown are nearly all of the black variety, and are grown for sale as animal food, or fed to cows on the holdings. No oats are grown for milling, and oatmeal finds no place in the dietary of the farmers and their families. Small quantities of wheat are said to be ground and used along with bought flour in home-made bread. Ryegrass and clover are sown to a small extent on the majority of the holdings.

It will be seen that the extent of potatoes exceeds an average of an acre and a half to each holding. In very few cases is the extent of potatoes less than half an acre, and on many of the farms it exceeds three acres—all, it may be said, grown for consumption on the holding, chiefly, of course, by the farmer and his family, but also to a large extent by pigs, and to a smaller extent by cows. The average produce of potatoes, even in a good year, would scarcely satisfy a Lothian farmer. It seldom exceeds $3\frac{1}{2}$ tons per acre. It is estimated that in the Skibbereen Union last year's crop of potatoes yielded about 17,000 tons—a little more than half a ton per head for every man, woman, and child in the Union. “Oh yes, sur, we live entoirely on the pratie, and what will become of us without it at all, at all—myself, my wife, and my family, my family of eight, sur?” “Have you no cows?” “Only one, sur, and two-three little pigs, sur. Shure we will be very ill off this year.” The father of this “family of eight” holds a very poor exposed farm of hardly five acres,

and his half Irish acre of "praties" will not yield him half a ton of eatable potatoes this year.

Here the question will very naturally arise, Has the Skibbereen farmer nothing else than the "pratie" to depend on for his daily food? Referring to the official agricultural statistics, we find that in the Skibbereen Union there were last year 29,367 cattle, of which just about one-half were cows. There were thus very nearly an average of five cows to each holding, and it is well known that there are few even of the very smallest holdings on which that most useful adjunct to a family, the cow, is not to be found. And it should be stated here that we were quite surprised to find so good a class of cattle in this very poor district. They are mostly of the shorthorn type, not big but well shaped, and of a thoroughly profitable and thriving kind. The great majority of the cows are quite capable, we should say, of producing bullocks good enough to fatten even into prime Aberdeen "beeves." Well cared for they are also, and most of them seem to be fairly good milkers.

Few sheep are kept here, only about one sheep—and it is not a good one—for every cow. There are very nearly as many pigs as sheep, and, upon the whole, they are of a better class, sometimes well cared for, but often, like other rent-payers, not very kindly treated. The feathered stock has a fair share of attention. It is estimated that there is an average of over 30 head of poultry to every holding in the Union of Skibbereen. Turkeys and geese are raised for sale in large numbers, and help to make up the rent on many a poor holding. The very small extent to which horse labour is relied upon will be gathered from the fact that last year there were only 2488 horses used for agricultural purposes in the Skibbereen Union—not equal to one for each holding. There are a good many donkeys, but these most useful creatures are not employed nearly so extensively here as in County Kerry. We found fewer goats than we expected—fewer goats and a greater number of cows. The holders who cannot keep a cow have at least one goat, some of them two or three.

These facts and figures will help the reader to understand the circumstances of the small farmers, who are chiefly affected by the visitation of the potato disease, and to better estimate

the importance of the information we may be able to obtain as to the actual extent of the disease.

II. WEST CORK—*continued*.

Having conveyed some idea of the holdings and stocking of the small farmers in the Skibbereen district of West Cork—and the conditions here fairly well represent a large stretch of the country along the seaboard in this county—I shall now confine my attention more closely to the subject of the potato disease. I have personally inspected a large number of holdings, studded over a wide stretch of country, mostly within eight miles of the sea-coast, the majority of them close to the ocean, where the blight was first observed, and where I have found its ravages to be the most severe. I will speak with decision only of such cases as I have thus inspected; for I have invariably found the hearsay evidence so contradictory and, where I have been able to test it by personal investigation and ocular demonstration, so utterly untrustworthy, that I cannot safely be guided by it.

In this district, then, I have found the crop very bad indeed. It is not by any means an entire failure. It is not nearly so bad as I was told, on what seemed good authority, I should find it. The disease has been general throughout this district, but it has not been uniformly destructive. I have seen several holdings on which it has rendered the crop a "total failure" as far as human food is concerned; and I have seen a good many others where only a fraction of the crop—perhaps a third, a fourth, or a fifth—has been so injured as to be unfit for consumption by the people.

The course of the disease here has been somewhat curious. It appeared phenomenally early, and has injured the crop mainly by the havoc it played with the leaves and stems. The summer from the very outset was wet and cold, and the potato plants, as soon as they came above ground, were swept by unwholesome blasts from the Atlantic. I was assured that "the blight" appeared on the young potato-shoots down by

the seaside here as early as the 14th of May, and that by the middle of July the disease was quite general, and the tops blighted everywhere within a few miles of the coast. The tops have almost entirely rotted away, so that in some cases it is only by close inspection that one could ascertain that potatoes had been grown there this season. With this early blighting of the tops anything like an average yield was out of the question. It is a moot point, I think, whether all this early mischief had been done by the fungus *Peronospora infestans*. Most likely the *Peziza postuma* has likewise had a hand in the catastrophe. For it is an earlier riser than the former, and its peculiar habit is to destroy the leaves before the crop has had time to attain anything like full growth. And there is no doubt that the unfavourable climatic conditions anticipated and paved the way for the fungoid visitation, which here at least some authorities would regard, not as the primary cause, but rather as the effect, the outcome of the injury which the crop had already sustained. I shall not attempt to give a deliverance upon these scientific points, further than to say that if the mischief here be the handiwork of what is commonly known as the potato disease—the fungus *Peronospora infestans*—I have never before known the fungus to behave exactly as it has done in this instance.

When I saw the condition of the potato-tops, I expected to find that the majority of such tubers as could be traced at all would be turned up in a rotten mass. Not so, however. The rule has been a crop of about two-thirds an average in bulk of tubers, from one-fifth to one-half of these touched with the disease, barely one-fourth fully grown, and the other three-fourths much under the usual size, and not nearly ripe. The loss is thus due much more largely to the growth of the crop having been prematurely checked than to the actual destruction of tubers by the disease. Only in a few cases have I seen more than a small fraction of the crop so consumed by the disease, so far decayed, as to be quite useless for pig or cattle feeding. The tubers actually diseased are considerably scabbed—not a few of them, of course, far gone with decay; but in the great majority there is still a substantial amount of useful animal food.

The worst feature of the crop is the deficiency of mature

potatoes. Even where there are only faint traces of the germ of the disease having reached the tubers, the great majority of these are so imperfectly grown, and in such a green immature condition, as to be very ill fitted for human food. The formation of starch has made little progress; and so, when boiled, the potatoes are wet and unpalatable—as unlike the well-matured “floury” Champion as any “tater” could well be. In the most severely afflicted parts I have seen there is a considerable quantity of sound potatoes, but they are mostly very small, unripe, and so of inferior quality as human food. To use such potatoes as the sole or principal article of diet would be very undesirable—I should be inclined to say dangerous. They cannot possibly be wholesome, and eaten alone or to excess might have serious results. Indeed there is reason to believe that some deaths have already been caused by too exclusive living on diseased or unripe potatoes. I learned that in this district there has already been a good deal of ill-health, which is attributed to the same cause. But it does not follow that these potatoes are all unfit for use as human food. Assuredly those tainted with disease and the smallest and greenest ones should be fed only to animals; but the sound and fairly well-grown tubers may safely enough be used by the people if they are carefully cooked and used in moderation, along with other varieties of food.

The verdict upon this district must therefore be, that while the crop in some cases is almost an entire failure, it is, upon the whole, decidedly better than has been generally reported—very much better than, I believe, those who saw the crop in the month of August could have expected to find it now. I am inclined to think that had the weather continued till now as unfavourable as it was early in the summer, there would scarcely have been a sound potato in all this district. There has lately been a spell of delightfully fine weather, and it has had almost a miraculous effect. It has completely checked the progress of the disease, and has done not a little to improve the quality of such tubers as escaped the fungus. What this fine, dry, June-like weather in September has done for the small farmers of this part of the country can hardly be over-estimated. In very many cases where I believe that otherwise there would not have been an eatable potato, it has

left rather more than half an average yield of medium tubers. What this means to these holders and their families will be readily imagined.

In this part of the country, as over Ireland generally, the Champion is the variety most largely grown. It occupies more than nine-tenths of the entire area of potatoes here, the other varieties grown being Flounders, White Rocks, Skerry Blues, and Scotch Downs. The great bulk of the crop was grown from seed which has been on the same holdings for eight or nine years—from seed imported from Scotland after the visitations of disease in 1879 and 1880. The question therefore naturally arises, Has the outbreak of the disease this year been to any appreciable extent caused or intensified by deterioration of the seed? This point will be considered more fully later on. Here it will suffice to say that in my wanderings in West Cork I have found little evidence that would support a charge against the seed. The crop has been uniformly sound and good for several years, and last year's tubers would seem to have been exceptionally robust. Then in several instances I have seen side by side on the same little field the produce of seed taken from Scotland last year, and of seed grown on the same farm for about eight years, and in no case could I discern the slightest advantage to the one over the other.

Culture and manurial treatment would seem to have had more influence this year than seed. As a rule I have found the crop best, bulkiest, and soundest where the seed was planted comparatively early and the land well manured with farmyard dung—best of all where such treatment was applied to dry land, on a porous subsoil, and of a naturally fertile character. On the other hand, the poorest crops and most disease are seen on poor soils, badly tilled and sparsely manured, and where the seed was late in being planted. Near the coast a good deal of sea-ware is used as manure for potatoes, and a share of the blame is laid upon this material, which many assert has a tendency to predispose the crop to the disease. Within sight of the Atlantic, as I have said, were some small fields of good land fairly well tilled, which had been manured with sea-ware, and in which there was not more than one-fourth of an average crop of sound tubers, and

these were small and immature. But while it is the rule that early planting and liberal dunging have given the best results, I have come across striking exceptions for which no feasible explanations were apparent.

The lazy-bed system is almost all-prevailing here. Occasionally a field in drills is met with, but the disease would seem to have done as much harm in the one as in the other. Somewhat primitive systems of rotation are followed. Oats or wheat, and sometimes sown grasses, come in between the crops of potatoes. If a field has lain for a few years in sown or natural grasses (and weeds), two successive crops of potatoes are often taken from it, and in favourable seasons the second crop may be better than the first. In this case it is considered a good plan to grow the first crop in lazy-beds and the second in drills. I have endeavoured to ascertain whether the crop on new land—land which has not before borne potatoes, or on which they have not been grown for several years—has fared better than on land cropped with them at the usual intervals; but the results here were so variable that it would not be safe to draw any definite conclusions from them. Some of the very worst fields I have seen have not before been under potatoes for seven or eight years. On the other hand, I have seen a really good sound crop on new land which had been well dunged, and which lies on a porous subsoil.

III. WEST CORK—*concluded*.

There is little doubt that the seaboard of West Cork has suffered greater loss from the potato blight than the more inland parts of the county. Unquestionably the crop is very poor on many inland holdings, notably on poor land, which gets little manure and imperfect tillage. In the Bantry district I saw some miserable crops, not half an average in yield, and nearly a third of these unsound. It must be said, however, that, apart from the seaboard districts specially referred to in the last letter, I found the crop in County Cork de-

cidedly better than I had been led to expect. The crop "digs up" surprisingly well—that is, in view of the weathered appearance of the tops, and the somewhat alarming reports one hears at all hands as to the "entire failure" of the crop. It varies greatly even on adjoining farms. On one there may be two-thirds of an average crop of sound tubers, moderately well matured; on its neighbour barely one-third, and this of very inferior quality. It is only by minute inspection of the potatoes themselves, by digging them out and inspecting them closely, that a trustworthy estimate can be formed as to the actual condition of the crop.

It may as well be said at once that it is most unsafe to rely either on floating reports or on statements made in response to direct inquiries by many who might be assumed to be well informed as to the condition of matters in their respective districts. I was solemnly assured that in certain districts the "poor farmers have not a single potato they could ate—the ne'er a one but what is black or as small as a marble, sur." I, of course, made tracks for such parts, and invariably found the crop quite different from what had been represented,—usually from one-third to one-half an average crop of sound, eatable potatoes—often, indeed, more than that. I listened with some amusement to a lively discussion between two constabulary sergeants as to the character of the crop and the extent of the disease in their respective districts. No. 1 considered it "not so bad at all. I get them good quality myself; and although the crop round about is smaller than last year, there is not many diseased." No. 2 retorts, "Well, indeed, it is not so in our part [the adjoining district], for there's ne'er a good potato to be seen. Why, sur," addressing the writer, "I daresay you will have seen a potato-field harrowed after the crop has been lifted. Well, sur, I assure you there is no more potatoes up my way this year than you would see after the harrows in that field." I did not argue the point, but I had been up that very *way* the day before, and found generally a crop from one-fourth to one-half short of the average, with one tuber in three to one in six or seven touched with the disease. I have never happened to see quite so much as this left behind the harrows.

Nowhere in County Cork have I seen a full average crop in bulk, and nowhere have I seen the tubers fully and evenly developed or all properly ripened. It is a poor crop, quite one-third under the average, and *very slightly* affected with disease. This is the worst that can with anything like an approach to the truth be said of the potato crop in County Cork—excluding, of course, the exceptionally unfortunate district along the seaboard spoken of in last letter, and perhaps one or two smaller spots inland.

I have said *very slightly* affected with disease. This statement may probably excite some surprise, for it is at variance with most published reports, as well as with the general tone of conversation. It is, nevertheless, incontrovertibly true. There is a large percentage of the tubers small and of inferior quality; but, outside the specially unfortunate district referred to, I have found very few potatoes which exhibit in the very slightest extent the germs of the well-known potato fungus. I account for this somewhat curious and unexpected condition of matters by the occurrence of dry, warm weather, which arrested the disease before its germs had in full force reached the tubers.

The significance of this point is very great. It justifies one in placing more reliance on the produce that is available than would otherwise be the case. A tuber which contains the germ of the disease will sooner or later give way to its insidious enemy. Immature tubers, if free from the germ of the disease, will improve considerably with careful storing, and be useful either as food for the people or as seed for next year's crop. The County Cork farmers are, therefore, much better off with their deficient crop, only slightly diseased, than from the blighted condition of the tops the most sanguine could have anticipated, even as recently as the end of August.

I am not speaking at random. I have taken exceptional care and trouble to arrive at the truth, and it is here faithfully represented. That this moderate view of the situation is the correct one would be gathered from the course of events in the potato markets, local and general. Prices are everywhere much higher than usual, in many cases double or treble the price obtainable twelve months ago, when the supply was in excess of the demand. In the Cork market, excellent

Champions, of fair size, and perfectly sound, are being bought at about £4 per ton. In small towns and villages throughout the country a common price is 6d. to 8d. per stone. These prices, to be sure, are high, comparatively speaking, but they are far away from "famine prices." In most cases the price has been falling recently, due mainly to the fact gradually becoming known that the crop, as a rule, is better than was expected it would be. The prices quoted are those given for sound potatoes, the best qualities to be had.

It is gratifying to be able to say that with the bad crop of potatoes the other crops are, for the most part, tolerably good. Wheat suffered from the excessive rainfall and deficiency of sunshine, so that in many cases the produce of grain from it is unsatisfactory. Oats were bulky, and turnips and mangels are exceptionally good. With the very fine weather lately, these root crops have made wonderful progress. The little extent of hay saved by the small farmers is not of good quality this year; but this will be counterbalanced by the bulky crops of roots. Many of these farmers sow rye to supply green food for the cows in winter. On some farms this is now coming up in a most promising braird; on others it is just being sown. The winter here is mild and open, and by Christmas the rye sown now will afford a rank cutting of excellent food for cows giving milk.

Another point of great importance for the small farmers here is the proximity of an abundant supply of excellent turf or peat. Fuel is to be had in ample quantity by the smallest holder, so that his humble hearth may always be warm. The dripping summer spoiled much of the turf this year, but during the past few weeks a very large quantity has been secured in good condition. In many cases a second supply was cut, and is now being stored. The dwelling-houses of the small farmers are still in many cases far from what could be wished, but in this respect a vast improvement has taken place, and is steadily going on. Very primitive many of these houses are, and it cannot be said that they are always tidy in the interior. With the free access to the family circle enjoyed by the "porkers," perfect tidiness is hardly to be expected. As far, however, as the mere matter of comfort is concerned, these small farmers are much better off than the

casual observer would imagine. It goes without saying that the families are large. Seven, eight, and ten are the general run. Occasionally one comes across a "baker's dozen"; and at long intervals a family of fifteen or sixteen may be met with. "Yes," said my companion the other day, "that man there, sur, has sixteen children, nearly every one of them twins." In the most remote parts there is excellent provision in the way of schools; and in the very poorest parts we visited in County Cork the school children were tidily and comfortably dressed, showing a marked contrast to what we have seen in some other parts of Ireland.

One thing which impressed me in conversing with the small farmers of County Cork was the wonderfully intelligent conception which most of them displayed as to the nature of the potato disease. None of them ventured to give it the "long-nebbit" name which learned people assign to it. Most of them, however, seemed to have a fairly accurate knowledge of its nature and mode of attack, as well as of the most generally accepted methods of prevention and mitigation. They are all fully impressed with the importance of having fresh, vigorous seed at short intervals. They know that the crop stands less risk of destruction on new or fresh land than on land on which potatoes have been frequently grown. And they are now well aware that there is great risk of the disease being carried from the one year's crop to that of the next in the crop refuse, such as tops and stray tubers. A most useful series of instructions on these points have lately been issued by the Commissioners of National Education for Ireland, and already they are bearing fruit, even on the rocky heights of West Cork, where I saw small tenants gathering and burning the tops and assorting the tubers, as was wisely advised by the Educational Commissioners.

The circular containing those directions, which the teachers in national schools were instructed to occasionally read aloud to their agricultural classes, is worthy of reproduction here. There is, unfortunately, potato disease in Scotland as well as in Ireland, and the remedial measures recommended are applicable to both countries. The circular runs as follows:—

POTATO DISEASE.

An attack of potato disease is calculated to do serious injury to the farmer in other ways besides the loss of the crop.

Decayed and decaying stems, diseased potatoes or old sets, if allowed to remain upon the land, will cause the disease to be kept in the district for years.

Directions.

First, At once clear the land of all decaying potato stalks and weeds ; collect them into a heap and burn them.

Second, Dig out the crop as soon as the growth has ceased, and sort them into badly diseased, partially diseased, and sound lots. Remove the badly diseased potatoes and old sets from the land, and destroy them by burning. Keep a large boiler, pot, or steaming vessel constantly in use, and as the potatoes are dug out boil well those *partially diseased*. Then, whilst they are hot, pack them in large barrels or other large vessels. Ram them well down, so as to exclude the air, and cover the openings of the vessels with earth. Thus packed the potatoes will keep as food for pigs, &c., for a considerable time.

Third, Place the sound potatoes in *small* quantities together, and sprinkle earth amongst them to allow of their becoming mature. Keep them very dry. Remove them, if possible, to another field, away from that in which they grew, or, if they are kept in the latter, dig up some of the subsoil and mix it with the potatoes. Do not cover the potatoes with "old stalks" or with the surface-soil of the field in which diseased potatoes had grown. Examine the potatoes occasionally for the purpose of removing such as show signs of disease.

Fourth, Change of seed is most important. Select seed potatoes from a soil different from that in which they are to be planted, and if possible from a distance. Potatoes grown on peat or moor should be chosen for the ordinary arable soils. Peaty or moory soils should be planted with potatoes from other soils. It is most advisable not to depend altogether upon one variety.

Fifth, Practise early planting in order that a good growth may be made before the period when the disease appears. Plant potatoes in land naturally dry as early as February, and where circumstances permit plant even in January. Low lands and bog should be laid in ridges during winter for the purpose of drainage and for securing as early as possible a dry seed-bed in spring. Plant all potatoes before they "sprout"; vigour is lost through planting potatoes whose buds have been taken off.

The small farmers of West Cork look forward to employment on the railway to be constructed to Baltimore. Many of them will, unquestionably, have to procure new seed for next year's potato crop. They say they are unable to pay for it in cash, but assert that they are ready and willing to earn it by labour, if the opportunity for doing so were

afforded them. In very few instances have I heard expressed an expectation of, or desire for, absolutely gratuitous relief. The cry is that the Government should provide them with work to enable them to buy food for their families during the winter and spring.

IV. KERRY, TIPPERARY, LIMERICK, AND CLARE.

The county of Kerry is in many parts just as poor, from an agricultural point of view, as the poorest of County Cork. Mountain, moor, and bog make up a large extent of Kerry, and on the poorer lands of the county there are a great many small holdings, the tenants of which can never, if they depend entirely on the produce of these holdings, raise themselves very much above the position of providing the daily bread as it is required. There are in this county about 5800 holdings which do not exceed 15 acres each in extent, nearly 1400 of one acre or less, and 1600 above one acre and under 5 acres. There are nearly 4000 whose area exceeds 15, but does not exceed 30 acres each.

All these holders, even the very smallest of them, own live stock of some kind. The vast majority of them have one, two, three or more cows, and those who cannot keep a cow own goats and some poultry, both of which contribute in no small degree to the comfort of the family. The extent under potatoes last year was 28,177 acres, or rather more than an average of an acre and a half to every holding in the county. The potato crop is thus one of great importance in Kerry as in most other parts of Ireland, yet the small farmers here have wisely devoted a good deal of attention to cattle and sheep. They derive a substantial share of their living from these, notably from those hardy and thrifty little cows for which the county of Kerry is famous. As showing the extent to which cattle-rearing is carried on in Kerry, it is worthy of mention that last year there were no fewer than 99,760 cows, making an average of over five cows for every holding in the county of one acre and upwards. On holdings

of 8 to 15 acres it is no uncommon thing to find from five to eight cows. In addition to these cows there were last year over 56,909 cattle over one year old, and about twice as many calves, with about 110,000 sheep and 70,000 pigs.

Although, in the aggregate, Kerry thus gives a good account of itself as to the material condition of its farmers, there are nevertheless many of its holders so poor that a total failure of the potato crop would throw them into a serious state of privation. The reports, therefore, that in a large extent of this county the potato crop had this year failed entirely or almost so, naturally caused much anxiety. Reports to this effect have been current for some time, and they have been repeated to me time after time in my wanderings throughout the county. I am happy to be able to say, however, that a close inspection of the crop itself does not confirm these alarming rumours. Unfortunately, in many cases the crop is indeed a very poor one. In a few instances it may be called an entire failure, for what little produce there is in these exceptional cases will be of use only for pig-feeding.

I have personally inspected a very large number of holdings in different parts of Kerry, having the potatoes dug out and inspecting them so closely as to count the proportion of tubers touched with the disease. I speak only from the information thus given to me, as it were, by the tubers themselves. To be guided by the appearance of the tops, or even by a casual glance at the tubers when dug out, would be misleading. The tops were early blighted, and their condition would lead one to expect that the crop was as near as might be if not an entire failure. Indeed it is pretty evident that the blighted condition of the tops is mainly responsible for the alarming reports which have become current as to the character of the crop. Here, as in West Cork, it is only by digging out the tubers and examining them closely that the real character and condition of the crop can be estimated with any reasonable degree of accuracy.

In the course of such an inspection in Kerry I found that the crop is almost everywhere below the average, but is by no means universally poor. There is, as a rule, from one-half to two-thirds of an average crop—in many cases more, in many cases less. The percentage of tubers actually diseased is

decidedly less here than in West Cork. It was, indeed, surprising to find so few of the tubers touched with the fungus. The tubers, as a rule, are larger and further advanced towards maturity than near the coast in West Cork—just as would be expected from the fact that the tops were not blighted so early here as there. But in Kerry, as in Cork, the tubers generally are small and imperfectly ripened. A considerable proportion is so small and so very green as to be quite unfit for consumption by the people.

It would be unsafe to make any general statement as to where the crop is best or worst. The results vary in the most curious manner, and have shown clearly that it is only by minute inspection that the heaviest losers can be known. I have, as a rule, found a better crop on new land, or land which had not formerly grown potatoes for several years, than on land frequently put under this crop. I saw really good sound crops on bog land and fresh moory land, and several of the worst crops were on old soil with an inclination to clay.

I was expressing surprise at the really good appearance of the crop upon medium land on low-lying holdings, and was told that these were favourable exceptions. "This land, sur, is well done to, it is well farmed and well manured, but if you go back to the poor land on the hills you will see them bad enough; no potatoes at all, sur." I went to the hills, inspecting the crop as I proceeded on my journey of fourteen miles. All through the crop was as already indicated—very bad in a few cases, and usually from one-half to two-thirds an average in bulk, with very little disease, but many small immature tubers. As I approached the hills it seemed to get better instead of worse, not heavier in the yield, but better grown and ripened, and freer from disease.

Amongst the small farmers in the bosom of the Macgillicuddy Reeks I had a most interesting ramble. Right good farmers some of these are—many of them just as bad as need be, and most of them I found cheerful and contented, with a moderate appearance of comfort, no lack of intelligence, and varying symptoms of industry and thrift. Most willing they all were to go with me and dig out the "spuds"; amusingly ingenious were some of them in their side-efforts to discover the object of my mission. "Perhaps, sur, you will be a gentle-

man from the Government; will we get any seed this year, do you think, sur?" and on the questions went, interspersed with remarks as to the failure of the potato crop and the difficulties they would have in providing food for their families.

I was hospitably invited to join at the family dinner of one of these Kerry-mountain farmers, high up on the "Reeks." It was a comfortable house of the class, one long room, quite fifteen feet long and ten or eleven wide, with earthen floor and hanging chimney. Chairs with straw-woven bottoms made comfortable seats. In the one corner near the cosy turf-fire was the dinner-table with its plentiful supply of potatoes and milk waiting the hungry family of eight. The opposite corner was the happy hunting-ground of a fine big white sow and her splendid lot of little ones. A very handsome sow she was of the large Yorkshire type, almost good enough for Sanders Spencer himself. And she was as well-mannered as she was handsome, and a good disciplinarian to boot; for during the dinner I could not but admire the irreproachable habits of that happy porcine family. The dinner-table was covered with a piece of canvas, and in the centre was turned out, in an inviting heap, a huge potful of well-grown Champions, with their jackets burst just as they ought to be, and as "floury" and as well flavoured as the most fastidious Irishman could desire. With these potatoes *ad lib.*, and a bountiful supply of milk, the rosy children and growing lads and lasses made a hearty meal. The mention of milk will no doubt interest dairy authorities, who are now so plentiful, and who would perhaps like to know something of the dairy management on an average farm on the Kerry mountains. There are eight cows—of the small Kerry breed—in this dairy, and there is an excellent market for the produce. It is all consumed on the premises. Little attention is paid to the system of "setting," for it is not allowed to sit long. Fastidious dairy authorities would probably say that, in the circumstances, it is just as well that this should be so. The "milk-house" is a spacious cupboard right over the corner assigned to the social sow and her numerous tribe of young ones.

In the markets throughout Kerry the supply of potatoes is smaller than usual, and prices average about 6d. per stone.

Two or three weeks ago, when it was thought the disease would be worse than it has turned out to be, the price was still higher, by nearly 2d. per stone. In other years 4d. per stone would be considered a good price. Indeed in a good potato year the supply is usually so much in excess of the demand that the local selling price would not nearly pay for the growing of the crop. I was told by some of the larger farmers in Kerry that they cannot now get a sufficient number of labourers to work their land; and I suppose that one must take the superabundance of weeds everywhere as evidence of this. Still the price of labour here is very low, rarely more than 1s. per day and food. Fortunately, all the crops, excepting potatoes and wheat, are good this year. Fuel will now also be plentiful, although much of it was damaged by the wet weather in summer.

Leaving Kerry, and taking tours of inspection through the parts of the counties of Tipperary, Limerick, and Clare reputed to have suffered most from the potato disease, I have found a very similar state of matters—a miserable crop in many cases, nowhere up to the average, and in the great majority of cases from one-half to two-thirds of an average crop, with little actual disease, but many small immature tubers. The entire failure of the crop is a rare exception, and the existence of the disease to any appreciable extent is by no means general. In a large extent of Tipperary the crop is wonderfully good. In Limerick and Clare the deficiency is greater; yet even in the worst districts of these there is a very much larger supply of sound tubers than was generally expected from the blighted condition of the tops and the alarming reports which had obtained currency. There was a plentiful supply of really good Champions in Ennis market the other day, and 6d. per stone purchased the best.

In the extensive range of country which I have now gone over nothing has impressed me more sadly than the dreadful waste incurred by the apparently unheeded growth of weeds. Farms on which weeds would seem to be systematically and persistently cut down are rare exceptions, as rare on rich lands as on poor. Fine old grass-land is as much neglected in this respect as the very poorest; and tillage land is little or no better. The potato fields and patches are, as a rule, one thick

mass of rank weeds. The early blighting of the potato-tops has, of course, given freer play to the weeds, so that I have seen the land at its worst in this respect. With all due allowance for this, however, it is undeniable—it is all too clearly obvious—that the grossest of neglect prevails as to the cleaning of the land.

V. GALWAY.

The county of Galway contains a very large number of small holdings—no fewer than 18,500—whose extent does not exceed fifteen acres each. There are of these about 1700 of one acre or less, and about 4300 over one acre, and not exceeding five acres in extent. Then, between fifteen and thirty acres in extent there are as many as 8800 holdings. The extent under potatoes in this county last year was about 43,251 acres, or an average of nearly an acre and a quarter for each holding. The oat crop covered a similar area, and between the two they occupied more than three-fourths of the entire extent put under sown crops of all kinds. There was an average of about one-third of an acre of turnips for every holding, big and little, and about one-sixth of an acre of wheat, with about the same area of sown grasses as turnips.

The past summer here was excessively wet and cold. The wheat crop, which is grown chiefly for grinding into flour for home consumption, was a poor one. The crop of oats, however, was far above the average, quite the best crop of oats that has been grown here for many years. There was not only an exceptionally heavy yield of straw, but also, as a rule, much more than an average return of grain. A large proportion of white oats is grown in this county, so that the fine crop of oats will be of great advantage to the small farmers.

As to the potato crop, I have found it extremely variable in this county, more so than in any other part of Ireland which I have as yet visited. Even in the worst districts here the reports are a trifle overdrawn. It is only in excep-

tional cases in which the crop could be said to have failed entirely, but these unfortunate exceptions are proportionately more numerous than in any of the other counties I have yet visited.

The outbreak of the disease has been extremely virulent in several parts of Galway. I have seen a very large number of holdings here on which from one-third to two-thirds of the entire produce, deficient as it is, is far gone with decay, many of the tubers turning up in a mass of rottenness. But, happily, this regrettable state of matters is by no means general. It is the exception, not the rule.

With such great variety in the results it is not easy, it would probably be unsafe, to attempt any general estimate of the character and production of the crop over the country as a whole. Very rarely, indeed, have I seen anything better than two-thirds of an average crop of sound potatoes. In the large majority of cases the produce of sound tubers which I have seen dug up would range from two-fifths to three-fifths of an average crop. Here, as in most other parts of Ireland, many of the tubers are very small, and, of course, far from ripe. They are, as a rule, of very bad quality for eating, and a great proportion is so wet and green as to be quite unfit for use as human food.

The course of the disease here has been unusually curious and erratic. The crop is, on the whole, poorer on the sea-coast than inland, but I have seen more actual destruction by the fungus in the interior than near the sea. One of the worst fields I have seen this season was a field of very rich old land, deep loam, with a tendency to clay. It is in the hands of its owner, and is in the highest state of fertility and cultivation. The crop of champions, grown from fresh seed put in in good time in well-tilled and well-cleaned lazy-beds, is practically a complete failure. The tops were blighted early in July, and now there is not more than one sound tuber where there would have been twenty or thirty in an average year; the others which formed at all having been entirely consumed by the fungus. This field is hedged in by high trees on all sides, and it is more than probable that the serious havoc made by the fungus here is mainly due to the want of ventilation. It is well known that the fungus

delights in close, low-sheltered spots, where fresh breezes can have little access. It is an ideal hunting-ground this for the *Peronospora infestans*, and it has bagged nearly all the game within its reach.

On higher ground, almost adjoining this field, much poorer in condition, but exposed to fresh air, the crop, although about one-third deficient in number and size, is comparatively free from disease. High up, on an exceptionally exposed field of moderate land in this very locality, the crop is not very far short of the average. On another field in this part also I found three-fourths of a small crop one mass of rottenness. This field, too, had been comparatively well tilled, and it had a free exposure to the four winds of heaven. It was the second successive crop of potatoes, however, and probably this explains the exceptional extent of the destruction by the disease. As a rule, I have found the best crops, those freest from disease, on bog land and on land which had not for many years before grown potatoes. On the poorer lands here, where little dung or manure could be given, the crop is, as a rule, very deficient, in many cases not more than one-fourth or one-third of an average crop of sound tubers.

But that the crop should, as a rule, be a poor one, could not, I think, surprise any one who observes closely the conditions under which the potatoes are here grown. The wonder, indeed, is not that the crop is deficient, but that there should be any crop at all in such an inclement summer as the past, and under such deplorably unfavourable conditions of culture as are manifested here in the great majority of cases. The system of rotation is not what it ought to be, potatoes recurring on the same land far too frequently. But the greatest defect of all is in the tillage, or rather in the want of tillage. Little or no attempt would seem to be made to keep weeds in subjection, and with the accumulated seeding of these for many years the potato land is now a perfect forest of weeds. In some cases, rank coarse weeds abound, and in others thick creeping plants which cover the surface almost as closely as an old meadow. I do not forget that the early blighting of the potato-tops gave the weeds exceptional freedom of growth this year. Nevertheless, it is obvious enough to a practical man that the land in these small holdings is literally one mass

of filth, the greater portion of which might be eradicated by timely and persistent labour. "Weeds, did you say, sur? Why, these worn-out lands will grow nothing else. The poor people would do nothing else all summer if they kept down the weeds." "You may tell that to the marines, my man; the land that grows that splendid crop of weeds would grow useful produce if it got the chance."

Moreover, the land is not only choked with weeds, but is neither drained nor dug as it ought to be. That the potato should give any increase at all, or be able even to reproduce itself under such unkindly conditions, is nothing less than surprising, especially to those who are accustomed to find it profitable to raise up potatoes with almost all the care a good gardener bestows upon his onion-bed. Nature is amazingly tolerant of man's abuse. It does rebel occasionally, however, and the wonder is, not that the Irish potato crop should fail now and again, but rather that it does not do so much more frequently than has been the case.

But bad as is the crop in many parts of Galway, it is not nearly so deficient over the county as a whole as has been represented. There is in most parts a tolerably large supply of potatoes which, although of inferior quality, may safely be eaten if judiciously and carefully cooked. There is also a considerable portion of the crop sound enough to be used as seed, if the tubers are now sorted and carefully stored. Undoubtedly, however, a change of seed would be very desirable for next year. The Champion is the all-prevailing potato here also, and most of the seed has been on the farms for from four to eight years. Very good potatoes either for seed or consumption can now be purchased in Galway at from 4½d. to 6d. per stone.

The people of Galway are greatly delighted with the grant of £180,000 to construct a railway from the town of Galway to Clifden, on the west coast of Connemara. The engineers are now pegging off the line, and the work of construction is to be begun soon after Christmas. It is expected that two years will be required for the making of the line, and care will be taken to give the people of the county the preference in the labour required. With this extra labour in prospect, the small farmers are, as a rule, in fairly good spirits. Many

of them may add largely to their usual incomes by working on the railway while it is being made, and it is quite expected that the material prosperity of the country through which it passes will be greatly promoted by the line when it is completed.

Those who have known the county of Galway well for twenty or thirty years have interesting experiences to relate as to the changes in the habits and conditions of the people. That there has been a marked improvement in the material condition of the people is the universal verdict. Their houses are much more comfortable, the people are better educated, have a greatly improved stock of cattle, sheep, and pigs, and are receiving more assistance from their friends in America. They are altogether more civilised, and live in a higher scale of comfort.

It would not be claimed that all the changes in the modes of living on these small Galway farms have been changes for the better. I daresay Galway has been pretty much like the rest of the world in this respect. With the advance of education, and the general spread of civilisation, comes unavoidably a rather more costly scale of living. A few of the more common luxuries of modern life have undoubtedly obtained a stronger footing in those poor farming communities than formerly, and are still probably on the increase. Licences for the sale of spirituous liquors are now very numerous; but I have no evidence to show whether or not the residents here spend more money on whisky and porter than the rest of their countrymen. The licences cost about £5 or upwards each per annum, and it may be assumed that they are not taken out by their holders for philanthropic reasons. If all these licensed houses are conducted at a profit, it is tolerably clear that in the course of the twelve months the small farmers of Galway must melt a good deal of hard cash in spirituous liquor.

I can speak with more confidence as to the use of the "noxious weed." Smoking is, I should say, the pet luxury of the small farmers of Ireland. They have the pipe in the mouth at all hours, and by almost every grown-up man from sixpence to ninepence per week is thus blown away in smoke—making an outlay on many small holdings of from 1s. to

2s. per week for tobacco alone. Naturally enough, the female members of the family have little sympathy with this indulgence, and I am inclined to think, from side remarks made to me, that strike organisers would have little difficulty in arraying the wives and daughters of the small farmers of Ireland in a powerful crusade against the "weed." What measure of success would be attained is doubtful; for I was solemnly assured by one worthy woman—a sworn enemy to the pipe sure enough—that many a farmer would rather want his meal than his tobacco.

The potato is still the staple article of diet with the people on these small farms, but as a rule they do not live on it anything like so extensively as in bygone times. They now use a great deal of tea and sugar, and for the more solid material they depend to a large and steadily growing extent upon flour. What little wheat they grow themselves is ground into flour for home use, and this is supplemented by very large quantities of American flour. This latter is usually very dear in these out-of-the-way parts. For ready cash the price is now about 25s. or 26s. per sack of sixteen stones, and if sold out in single stones it runs up, perhaps, to 1s. 10d. per stone. Very little oatmeal is consumed by the people here. It is disliked by most of them. Milk is tolerably plentiful, and a large stock of poultry is kept.

A very large extent of Galway is ill fitted for agriculture. The rock comes near to the surface, which is studded, and in some parts almost entirely covered, with huge boulders. A vast area consists of barren moor and bog, and even on these many small farmers are struggling to earn a living for themselves and their families. Fuel is everywhere abundant, and many of the small holders add a few shillings to their incomes by carting turf into Galway and other places for sale.

The stock of cattle in Galway is of a fairly good class, but comparatively small in numbers. There are only about 44,000 milch-cows in the entire county, not a great number amongst 33,000 holdings. Most of the young cattle are reared till they are one or two years old. The cattle are, as a rule, of a useful mixed-bred class, with the shorthorn element prevailing. Good pure-bred bulls are much wanted here, and these would materially increase the income of the

small farmers. A very large stock of sheep is maintained in Galway, in all about 589,000. Not a few of these belong to small farmers, and they are, as a rule, of a fairly good class, mostly of the Roscommon character.

There is comparatively less pig-rearing than in some other counties. The pigs of all ages would not much exceed an average of two to each holding. There are few goats, about 19,000 asses and mules, and only about 30,000 horses of all sorts and ages—not one for each holding. It is thus obvious that the spade plays an important part in the agriculture of Galway.

VI. MAYO.

In a journey from the county town of Galway to the smaller and thriving, but not over-cleanly, town of Swinford, in Mayo, one passes through an extensive and ever-varying range of country. There is not a little of the land of excellent quality for agricultural purposes. The greater portion of this, as well as of the medium soils, lies under permanent pasture, and carries a moderate stocking of well-bred cattle, and a sprinkling of sheep of an equally good character. A large tillage farm is an exception here, although on every farm there is a certain extent under tillage, worked in a manner which one scarcely feels justified in describing as invariably advanced and thorough. But a great proportion of the earth's surface in this region of the Green Isle is exceedingly ill fitted for agricultural purposes. Bog, moor, rock, and boulder abound on all hands, giving the country a non-inviting appearance to the enterprising farmer. The eye was more particularly upon the potato crop, however, and at various points of this journey I had an opportunity of seeing the produce dug out. The results vary greatly, but on the whole the produce is not so very bad—considerably better than had evidently been expected a month or six weeks ago. Much rottenness is a rare exception; small immature tubers the rule.

Swinford was the centre of my "mining operations" in Mayo. I have examined the crop in this district in a most laborious and painstaking manner. I have walked over a very large number of the small holdings here, have seen the potatoes dug out, have examined the soil, noted the cereal and root crops grown, the system of working the land, the live stock kept, and the general outward conditions of the occupants of the farms. The intercourse with these small Mayo farmers has been most agreeable and interesting to me. They have been frank and friendly, have given me the fullest opportunities of seeing their little holdings and modest homesteads, and have discussed their position and prospects with marked intelligence and with more cheerfulness than I had expected to find. It is understood that the Swinford district is one of the most severely congested districts in the West of Ireland, and the reports circulated as to the potato crop here have been exceedingly alarming. For these reasons I have made my personal investigation of the potato crop in this part of the country exceptionally extensive and thorough.

That the Swinford district is seriously congested will be obvious to the most casual observer. Originally the surface must have consisted chiefly of bog, moor, solid rock, and loose boulders. Over the land the small homesteads are now studded thickly, often in groups, sometimes singly, and occasionally in couples. As a rule, the holdings, as well as the separate fields, are fairly well laid off,—a characteristic feature being massive fences of stone walls, made thick and high, to hold the many stones dug out of the cultivated land. The dwelling-houses are small and primitive-looking, but as a rule they are tolerably comfortable. With whitewashed walls and straw-thatched roof, many of these humble dwellings have indeed quite a smart appearance in the rather sombre landscape in which they are placed. Some of them have small gardens, stocked chiefly with cabbages and onions. In rare instances is there any attempt to brighten the home by the cultivation of flowers.

The entire arable area of Swinford Union does not exceed 32,000 acres, yet it contains no fewer than 7753 holdings of 1 acre or upwards. Of these holdings, about 4700 do not exceed 15 acres each, 138 do not exceed 1 acre, and 518 are

over 1 and not over 5 acres each. Then there are 2433 holdings over 15 and not exceeding 30 acres, 424 between 30 and 50 acres, 125 between 50 and 100 acres, 45 between 100 and 200 acres, 13 between 200 and 500, and only one holding over 500 acres in extent. All kinds of sown crops, including meadow and clover, covered only 31,591 acres last year; but there were in addition 77,400 acres in grass—partly two or three years' old lea, and partly old grass. There are barely 500 acres of trees in the entire Union, which extends to 151,494 acres. The population of the Union is about 52,000, and its valuation last year was only about £41,000. The assessment for the relief of the poor amounts to about 4s. in the £, and it would seem that the Union is in debt.

After the potato failure in 1879, new seed to the cost of £27,000 was advanced from the Treasury to the small farmers of this Union. The price was £12 per ton; and I understand that about £21,000 of the original sum has now been repaid by the farmers. Again, in the spring and summer of 1886, the inhabitants were in great want, and were maintained for several months almost entirely on charity. It is evident that the great majority of the holdings here have been subdivided to provide each son as he married with a separate home of his own; and it is in this way that the congestion has arisen. The rents here run from about £3 to £4 for the great bulk of the holdings under 15 acres, and it would seem that, on the whole, good feeling exists between landlord and tenant in this district. Judicial rents have been fixed in most cases without the aid of the Land Court.

It is thus apparent that the failure of the crops here would be followed by very grave consequences. Happily, however, the crops this year are by no means so poor as they have been represented to be. I was led to understand that the potato crop in Swinford was an utter failure. I have not found this to be the case. I have been over several holdings on which the produce is so deficient and so ill-matured that it must be regarded in these cases as practically a failure. These, however, are exceptions. Upon the whole, I have found the crop just about as good here as in Kerry and in the inland parts of West Cork, and better than in many parts of Galway and the seaboard of West Cork. There is comparatively little disease;

in some cases one diseased tuber in four or five,—as a rule, one in ten or fifteen. I have examined a dozen fields in succession here without finding more than the merest traces of disease in the tubers. The loss, as in most other parts, arises from deficiency of produce rather than from destruction by disease. The majority of the tubers are small and green, and the whole crop is of inferior quality as food for the people. To say that the potatoes are unfit for human food, however, is going much too far.

As to the yield, it is, as a rule, from three-fifths to one-third below the average. I have come across a few cases here in which there is a full average yield of sound tubers of medium quality. These good crops are grown either on new land of a peaty character, or on well-managed old land worked in a judicious rotation, well tilled and liberally manured. I examined many fields of exceedingly poor soil, thin and moory, lying on a very stiff, unkindly subsoil, and on these, with an admittedly stinted allowance of manure, the crop could not be otherwise than small. Here, as in the south, the blight came upon the tops very early in the season; and it is generally admitted by the farmers themselves that the crop is digging out better than they expected it would have done from the appearance of the tops in August. I am quite of opinion that had the wet weather of early summer continued on till the end of September, the potato crop here would have been an absolute failure, or very nearly so. Thanks to the favourable change in the weather, it is turning out to be not so very black as it has been painted.

The crop is now being dug, and, as a rule, the farmers seem to be moderately careful in sorting the tubers. Many of them are storing separately for seed the soundest tubers, grown on new or fresh land. If the potatoes can be spared from the supply of food for the family, there will be abundance of good seed in this part of the country. Many of the farmers I have spoken to, however, expressed an anxious desire to have new seed, if only they were able to procure it. The Champion is the all-prevailing potato, and I am bound to say that I think it is here almost as robust in constitution as ever. On all the small farms the tillage is done by spade labour, and everywhere the potatoes are grown in lazy-beds. The system of

tillage here is a trifle more thorough than in some other parts I have visited, but it is, as a rule, very far from what it ought to be. Again, let me say that the weeds get too much freedom—far more than is good for either the land or the potatoes.

The great error lies in allowing the weeds to mature their seeds. It is the habit with many of the farmers to gather weeds and other vegetable refuse into the dung-pit. This is in itself a commendable plan, for the supply of useful manure may be thereby substantially enhanced. Unfortunately, however, much of the good that would be done is counterbalanced by the mischief which is inflicted upon the soil by the seeds of such weeds as are allowed to attain maturity before they are cut down. All such material to be gathered into the dung-pit should be cut down or uprooted before its seeds have been formed. On nearly all the holdings some sort of method is followed in alternating the crop. As a rule, potatoes succeed either oats or lea, and on the better managed places ryegrass and clovers are sown along with the oats. Hay is cut the first year, if the grass can be spared, and the land may be allowed to lie two or three years in pasture. By the third year, however, the pasture is usually of poor quality, and not very abundant.

In the Swinford Union, potatoes and oats occupy nearly equal areas—about 11,000 acres each. All the other sown crops, exclusive of grasses and clovers in rotation, occupy considerably under 2000 acres, of which 850 are under turnips. Sown grasses in rotation cover about 2200 acres. For the direct supply of the food of the family the potato is thus the principal crop. The oat crop, however, is also of great importance to these small farmers, and it is gratifying to be able to say that the yield of oats both in straw and grain has this year been exceptionally abundant. It is surprising, indeed, to see such a quantity of oats on these poor holdings, and it was a genuine pleasure to note the very tidy and careful manner in which this crop has been reaped, stacked, and thatched. If anything like the same amount of care were exercised in keeping the potato land clean as in harvesting the oat crop, the produce of the holdings would be very substantially increased. Everywhere the supply of turf is abundant.

Few sheep are kept in the Swinford district, on an average barely one for each holding. Neither is the stock of cattle very large. On nearly all the holdings there is at least one cow, the total number of cows in the Union being about equal to two cows for every holding over one acre in extent. The cows are, as a whole, of a fairly good class. There are scarcely a thousand horses in the entire Union used for agricultural purposes, about one horse for every seven holdings. On almost every holding there is an ass or a donkey, an average of nearly two pigs to each farm, big and little, and a very large stock of poultry, including geese and turkeys.

There is no employment near at hand for the surplus labour. The men and lads go to England for from five to ten months of the year, and they bring home from 10s. to 20s. for every week they are away. Cheap fares are granted to them for these journeys, the ticket to Liverpool from this district being only about 12s. A very large number of young men and women have gone from this district to America and Canada, and these send home a good deal of money to their parents.

Great efforts are being made here to have a line of railway constructed from Claremorris right past Swinford to Collooney in County Sligo, but it seems doubtful whether the agitation will be successful in its object. There would appear to be a strong desire in Swinford to have some useful employment provided for the people, but most of the leading men in the district make no secret of their decided aversion to aid in the shape of the gratuitous feeding of the inhabitants. One influential citizen, whose sympathy and political feeling are entirely with the people, and who knows well their circumstances and habits, assured me that he would almost as soon see them in starvation as witness a repetition of the demoralising scenes which occurred during the gratuitous feeding of the poor people of Swinford in 1886.

VII. DONEGAL.

It is a far cry from Mayo to Donegal. In the varied stretch of country which intervenes there are several districts which I should have liked to have visited, but my process of investigation is of necessity so very slow, that if I attempted to "prospect" every district it is just possible that a new crop of potatoes might be ready for inspection before the examination of the old would be completed. Taking a few long leaps at a time, I have given my attention chiefly to those parts of the country which are reputed to have sustained the severest strain from the potato plague. The county of Donegal has attained unenviable prominence in this respect, and I am sorry to say that in many of the parts which I have already visited here I have found the enemy almost as black as it has been painted. More than this I shall not say as to the potato crop until I have completed my tour of inspection. Meantime, however, a few general notes as to the circumstances of the small farmers of Donegal may be of interest to those not acquainted with this cold northern region of the Green Isle.

In the county of Donegal there are in all about 32,000 holdings. Of these 1400 do not exceed 1 acre in extent; above 1 acre and not over 5 acres, there are about 2600; above 5 and not over 15 acres, 10,300; above 15 and not exceeding 30 acres, 8500; above 30 and not exceeding 50 acres, 4041; above 50 and not exceeding 100 acres, 3234; above 100 and not over 200 acres, 1070; above 200 and not over 500 acres, 358; and upwards of 500, 110 holdings. Donegal has a greater number of small farms—that is, of holdings—between 5 and 30 acres in extent than any other county in Ireland excepting Mayo and Galway, and upon the latter it approaches very closely. County Down is not far behind, and it has by some thousands the greatest number of holdings under 5 acres.

These statistics represent the Donegal small farmers in a somewhat rosy light. The great majority of them have holdings between 5 and 30 acres in extent, but as a rule only a small portion of the holding is under tillage. Perhaps only

a half or a third of it is capable of being cultivated. The rest consists of bog, moor, rock, or boulders. The statistics of the extent under sown crops bear out this. The entire area in Donegal under all kinds of crops, including meadow and clover, extends to only about 237,400 acres, or little more than an average of 7 acres to every holding. Then the Union of Glenties, which embraces a wide area of the highlands and seaboard, has an average of less than 5 acres for each of its 6600 holders.

A notable feature in the Donegal farming is the large extent allowed to lie under permanent grass. Even of a 5-acre holding a certain portion is assigned for tillage—that is, for the oat and potato crops—and a certain portion for pasture and hay. The former is tilled year after year, and put alternately under potatoes and oats, while the grass land is grazed and meadowed continually, most likely both each year. The sheep and cattle graze all over the holding early in the season; and when the pasture on the rough moors and mountains has made some progress, the stock are turned out there. The grass land then throws up a short but wonderfully thick crop of hay, which is of poor quality, and often saved in bad condition. Hay grown in such circumstances, and saved so late in the season—much of it is only now being stacked, some of it just being cut—could not possibly be either palatable or nutritious. The produce per acre, however, is surprisingly abundant. The average yield of hay for the whole county of Donegal is officially stated at over two tons per acre, and the importance of this crop to the Donegal farmer will be gathered from the fact that last year it extended to nearly 69,000 acres, about one-third more than the area under potatoes, and within a third of the area sown with oats. The small farmers depend upon hay to a large extent for the food of their cows in winter, and up here the cattle need far more hand-feeding in winter than in any other part of Ireland.

It is assuredly a wise plan to save hay on these holdings, but it is a serious mistake from several points of view to have the meadow land and the tillage land distinct from each other to such an extent. It leads to greater deterioration of both the meadow and the tillage land than would take place if the oats, potatoes, roots, hay, and pasture were methodically

intermixed in a judicious rotation. It may, perhaps, save labour. It is easier, no doubt, to dig in potatoes and dig them out again in land where oats were grown last year and potatoes the year before, than in land which had lain under grass for a few years, and so become tough in the surface. But it is well enough known that what fits the farmer's personal convenience best does not always best serve the land or the crop. The small farmer of Ireland loves his little bit of land almost too well; yet he does not use it in a manner calculated to husband its resources. He also lays great store upon his "praties." He is just as improvident in his method of growing them.

Donegal is famed for its crops of oats. It grows usually between 80,000 and 90,000 acres of oats, the area having gradually decreased by about 10,000 acres within the past ten years. The average yield is stated at about 12 to 13 cwt., or from 32 to 38 bushels per acre. This year the crop is decidedly above the average in bulk, but, unfortunately, much of it has been injured by inclement weather in the harvesting. There is still a great deal of this crop on the fields, in some cases in stooks, but more generally in small rickets, and the quality of the corn for grinding into meal has been much deteriorated. The crop, however, will supply more than the usual amount of food for cattle, and this applies as fully to the small holdings in the poorer parts as to the farms in better favoured districts.

Wheat and barley are grown only to a very small extent. Turnips grow well in the county, and are raised to a moderate extent by the small farmers, not so largely as would seem desirable. Last year there were 17,618 acres under turnips, about 2000 acres more than ten years ago. Few mangels are grown—less than 1000 acres in the whole county. Flax was at one time cultivated to a considerable extent on the small holdings, but it has in most of these cases been abandoned. It is only at long intervals that flax succeeds on any soil, and on the small holdings the system of rotation was not suited for it.

The potato crop has its characteristic share of attention in Donegal. Its area is usually about 45,000 acres, equal to about an acre and a third to every holding in the county.

The extent assigned to the crop has been diminishing slightly in recent years, the decrease since 1880 being fully 10,000 acres. I am inclined to think, however, that this wholesome contraction has not occurred to any appreciable extent on the smaller holdings.

When it is mentioned that, with nearly 32,000 holdings, Donegal has only 20,000 adult horses, it will readily be understood that this county is very largely dependent upon spade labour for the tillage of the land. The donkey is not so largely employed here as farther south. There are barely 2500 of these most useful beasts of burden in the entire county. The stock of cattle is fairly numerous, but not, as a rule, of a good class. On the small farms they are usually small, stunted-looking, and ill-shaped, many of them brindled in colour and of a stamp not liked by feeders. They are evidently slow growers and sluggish in fattening, and the cows are scarcely moderate as milkers. There is great need for improvement in the class of cattle. In effecting this improvement great care and skill should be exercised, for none but hardy beasts could thrive on these poor holdings. Nearly all the small farmers have one, two, or more cows. In the Union of Glenties, for instance, there is very nearly an average of two cows for every holding, big and little. Donegal possesses nearly 200,000 sheep and about 38,000 pigs, and the small farmers have a large proportion of these. It will be seen later on how substantially the few sheep they own contribute to the living of the small farmers and their families. This county is noted for poultry-rearing. Many of the small farmers derive no inconsiderable sum from eggs, the production of which they pursue with commendable enterprise.

The greater part of Donegal is a bleak, bare, mountainous country. In my wandering through it, I have more than once unconsciously imagined myself in the county of Sutherland. There is a greater extent of brown moor here than in that northern Scottish county, and there is a vast deal more of the surface covered with solid rock or huge loose boulders. Along the sea-coast and in most of the inland straths there are irregular stretches of arable land, but only in exceptional cases does the soil seem to be so kindly and fertile—and rarely, let it be said at once, is it so well handled—as is the

arable land of Sutherlandshire. The small holdings have in most cases been laid off with some degree of taste and regularity, but the land itself almost everywhere gives unmistakable indications of primitive and improvident farming. These remarks, of course, apply to the seaboard and highland districts of the county.

The better-favoured parts of East Donegal, and an occasional farm or two in other districts, exhibit a system of farming which seems to be on the whole advanced and profitable. Even here such glutinous weeds as docks, thistles, and rag-weed, are held in higher respect than they deserve from good farmers. Yet there is in these parts the general appearance of thrift, intelligence, and enterprise which one invariably finds in well-farmed districts.

That the poorer and less-favoured parts should compare unfavourably in this respect is perhaps only what might be expected. It is a rule this which, I daresay, has a very wide application; yet in my wanderings over our own kingdom, and elsewhere, I have met with many striking exceptions of cases in which the small holdings and poor lands are worked in a manner which throws far into the shade the average standard of farming on large holdings and good land. I cannot conscientiously pay this compliment to the small farmers of Donegal. They are—the great majority of them, at least—placed in untoward circumstances, but in rare exceptions have they made the most or best of what they have got. There is a want of thrift and intelligence and industry in the working of their little holdings which I could never contemplate without a feeling akin to surprise. I have had opportunities of observing the behaviour of Irish men and women—the sons and daughters of these small farmers, and many of these farmers themselves—as farm labourers, and at other varieties of labour in countries other than their own, and if one were to judge from that behaviour, one would certainly expect to find their humble homes in the Green Isle, which they all love so well, wearing a different aspect from what they generally present. Although the county of Donegal is now more particularly under notice, these remarks apply in a varying measure to the whole of Ireland. I have, I gladly acknowledge, seen samples of farming amongst the small holders of

Ireland which would delight the most fastidious. The rule, however, is exactly the reverse, and it would serve no good end to overlook or minimise this regrettable state of matters.

VIII. DONEGAL—*continued.*

Now that I have completed my "borings" in Donegal, I am sorry to have to say that I cannot improve upon my earlier impressions which were indicated in last letter. I think there can hardly be any doubt that in Donegal the loss from the potato plague will be heavier than in any other county in Ireland. I have seen certain parts in Cork and Galway as bad as any here, but nowhere else have I seen the crop so uniformly deficient, with so many of the tubers injured by the fungus, as in the seaboard and highlands of Donegal.

There is good reason to believe that the greater injury which the disease has inflicted in Donegal is due mainly to the fact that the wet and cold character of the summer continued longer here than in most other parts of Ireland. I have more than once made reference to the remarkably fine, almost June-like, spell of weather which has been experienced lately in several counties farther south. And I ventured to express the opinion that that June-like spell of weather had in many parts saved the potato crop from almost complete destruction. In Donegal, unfortunately, the elements have not been so merciful to the farmer. Here the only cessation of the cold dripping weather which prevailed throughout the summer was in the second and third weeks in September, and the short-lived glimpse of bright sunshine and clear sky was unable to do more than give a temporary check to the operations of the potato fungus. With the return of dull, wet weather, which has prevailed during the past three weeks, the insidious enemy resumed its destructive work, so that from their weed-covered, water-logged, ill-made beds, the Donegal "praties" are turning out in a miserable condition.

The blight did not appear on the tops quite so early here

as in West Cork, and I am inclined to think that in the numbers and the size of the tubers Donegal is no worse off than some of the other counties. Here the tubers are certainly, as a rule, both small and "seldom"—not quite so small, I think, as in County Cork and County Mayo—but it is in the proportion of diseased tubers that Donegal compares most unfavourably with other parts. The heavy and continuous rainfall has facilitated the transit of the spores of the fungus from the tops to the tubers, and it is evident from the appearance of newly dug potatoes that amongst these the fungus has lately been remarkably active.

It is obvious, both from the soaked condition of the soil and the character of the weeds which luxuriate so profusely, that most of the tillage land in Donegal sorely needs arterial drainage. This of course intensifies the effects of the wet season, and the two combine to lay the much-loved but ill-cared-for potatoes an easy prey to their insidious enemy. I am quite prepared to believe that a great extent of the land would be rather difficult to drain thoroughly with underground drains, yet the small farmers and their sons might with much advantage employ a little of their long spells of partial idleness in the winter months in providing means of carrying the surplus water from their arable land.

To form a perfectly trustworthy estimate of the produce of potatoes in the county of Donegal would be extremely difficult. The deficiency occurs chiefly on the seaboard and in the highlands. The crop is not uniformly bad. Now and again I have come across—usually on fresh, moderately well-drained bog-land—a fairly good-looking crop, from one-half to two-thirds of an average yield of rather small-sized sound tubers, with a very small sprinkling of disease. These, however, are exceptions. The rule is an imperfectly grown crop, which will afford little if any more than from one-fourth to two-fifths of an average yield of sound, eatable potatoes. In most cases the proportion of tubers touched with the fungus varies from one in three to one in ten, and a great many of these are far gone in decay. Several cases of complete failure we have seen, but over the county generally such instances would be rare exceptions. I have been assured by those whose opinion is entitled to carry weight, that on the small farms of Donegal

the yield of sound, eatable potatoes would not exceed one-fourth of the produce of an average year. The results of my inspection of the dug-out potatoes would not lead to quite so low an estimate as that. From 30 to 40 per cent of an average yield would come nearer to what I have seen.

This "average yield," I may say, is not by any means high. Of tubers it is only about $3\frac{1}{2}$ tons per statute acre. Of weeds, which should not be there at all, it is often twice as much! A passer-by would sometimes be at a loss to know which was the potato-field and which that of grass. The cover of herbage is often just about as close and luxuriant in the one as in the other. Possibly the small farmers of Ireland may be of opinion that the "pratie" delights in the company or in the shelter of an abundant growth of weeds. I have met some farmers who believe that one crop is enough for the land at a time, and who spare no trouble to carry their belief into practice. Somehow these single-minded farmers contrive to dig three or four times as many tubers from an acre as are obtained by the over-ingenious Irish farmer, who seems to expect that the potato-field should give him a crop of hay from the surface, and a crop of "praties" from the under-soil. One thing at a time, and that done well, would be a good motto for the Irish potato-grower—if only he would carry it into practice.

In Donegal, as in most other parts of the country, I have, as a rule, found the best crops the soundest and best grown, if not always the best in point of numbers, on soils of a decidedly boggy (*i.e.*, mossy) character. It is proved beyond question that potatoes thrive uncommonly well in land in which there is a considerable amount of decaying vegetable matter. Good crops of potatoes are often grown in fresh, boggy, or moory land, with little or no manure, and as often as they can the small farmers of Ireland put the potatoes in land of this character. I have this year seen surprisingly good crops of champions on land which seemed composed entirely of bog (*i.e.*, moss): such material, in fact, as would make excellent turf for the fire on the farmer's hearth.

So long as he has fresh land for the crop the Irish farmer succeeds fairly well with his potatoes, but in the growth of the crop upon old land he has more often failed than succeeded.

The small extent of his holding no doubt hampers his operations, but I have visited very few holdings in Ireland on which it would not be possible to carry out a system of cropping which would introduce from three to five years between every two crops of potatoes, and yet give the farmer as many stones of potatoes as he obtains under the close-cropping methods which are now prevalent.

In Donegal the prevailing system of rotation is as bad as it could well be. In most cases oats and potatoes follow each other almost continuously, and it is by no means rare to find a farmer growing potatoes year after year for two, three, or more years on the same little plot of land. The worst crops I have seen, those most largely destroyed by disease, have been grown on land which carried potatoes last year or for the two or three immediately preceding years. And, unfortunately, many of the farmers would seem to have but little idea of the risk which they run in pursuing such a dangerous practice. I was sympathising with a small farmer in the Ardara district of Donegal who was digging out a very poor crop, with more than 50 per cent diseased, and my conversation brought forth information which I was scarcely prepared to receive. "Yes, sur, they be very bad. Last year in this very bed where I have got all you see of them rotten things, not a creelful, I had the full of three creels of splendid 'praties.' Yes, sur, I had 'praties' in it last year. Ah, it is elegant 'pratie' land, sur! It has grown 'praties,' beautiful crops, sur, for five or six years, and ne'er a crop of corn. It is splendid 'pratie' land, sur; but look at it this year. I will have to dig all day to supply the family, sur." It was a bad crop certainly, and with such admirable devotion to the "pratie," it was no doubt trying to the farmer to find that the "elegant pratie land" had failed him at last.

Upon this same farm I found that another field had been grazed and meadowed every consecutive year for six or seven years, and yet the simple-minded farmer seemed to think that the fates were sadly against him when he found that his crops were beginning to fail.

A great portion of the arable land on the small farms of Donegal, as on those of other Irish counties, is thoroughly "potato sick." It has grown potatoes so frequently for so

many years, that it cannot be expected to yield either a bountiful or a robust crop. To pursue this system would be extremely dangerous, for any influence which tends to impair the vigour of the crop predisposes it to destruction by disease. These small farmers must break up patches of their grass-land for potatoes, and must allow a longer interval to elapse between every two crops of potatoes. Unless they do this, the risk of repeated epidemics of the disease will be greatly increased. And along with this extension of the system of rotation, they must have the land better drained, so that the tubers may have dry, airy soil to grow in, not such cold, water-logged soil as is now generally to be found in the potato-beds of Donegal and other parts of Ireland. There should also be a little more liberality in manuring, and a vast deal more hand labour in tillage and weeding. The supply of dung is far from adequate, and little artificial manure is employed. Sea-weed is plentiful on the Donegal coast, and it is used pretty freely on the potato-land along the seaboard.

In many parts of this county the short-sighted and altogether objectionable system of "paring and burning" is pursued. In the month of April, or as soon as it is sufficiently dry, the turf or sods which cover the surface of the potato-patch are gathered into heaps and burned, and the ashes spread over the land as manure. The ashes stimulate the early growth of the potatoes, but the practice should be condemned for at least two important reasons: it leads to the waste of useful soil, and encourages late planting. The burning cannot be carried out until the land is tolerably dry, and thus planting is often unduly delayed.

The lazy-bed system prevails generally on the small farms of Donegal, yet in several instances the crop is grown in drills. The Champion is the variety most largely grown here, and it has upon the whole given good results for six or eight years. The other kinds grown in this county are Flounders, White Rocks, Skerry Blues, Magnum Bonums, Brown Rocks, Scotch Downs, American Whites, Kemps, Cruffles, Gawkies, &c. I have not been able to obtain such conclusive evidence as would justify me in saying that any one variety had clearly excelled the others, or had failed more signally than its neighbours. One variety has fared best on one farm and

another upon a different farm. I saw some crops of Skerry Blues almost a full average in numbers and size, but fully one-third of the tubers were diseased. It is evident that in Donegal a large quantity of fresh seed will be required for next year's crop.

The procuring of this will be a matter of great importance to the small farmers, who still to a great extent, although not so largely as in former times, depend upon this one crop for the sustenance of themselves and their families.

Happily considerable progress has been made in Donegal in the development of what may be called side industries amongst the small farmers. Almost incalculable benefit has already been derived from this admirable movement, to which fuller reference will be made in my next letter.

IX. DONEGAL—COTTAGE INDUSTRIES.

In view of the shortcoming in the potato crop this year, it becomes an important question to consider to what extent the small farmers are now dependent upon the potatoes which they grow, and what other sources of food and income are available to them. In regard to the county of Donegal, several parts of which are at the present moment more seriously congested than ever before, it is gratifying to be able to say that the potato can no longer be truthfully described as the "staff of life," or the main support of the small farmers and their families. Even here there is still far too much reliance placed upon the potato crop, yet by degrees comparatively greater attention is being given to the growing of other crops, to the raising of live stock, and to extraneous sources of revenue.

It was indicated in the last letter that the small farmers of Donegal hold amongst them a very large number of cattle, sheep, pigs, and poultry, and that they raise a considerable quantity of oats. One estimate, made by a man well acquainted with the county, and inclined to err on the side of

safety, places the quantity of oats available for sale or grinding into meal on the small farms of Donegal this year at an average of about seven quarters, or one ton per holding—this being the quantity he believes to be available after setting aside food for the farm-horses and seed for next year's crop. Unfortunately, in many cases the quality of the oats has been much injured by the wet weather in harvesting, but there is more than an average bulk of both grain and straw. It is not likely that much of the wonderfully abundant crop of hay will be available for direct transference into money. It will be required for the maintenance of one, two, or more cows, the value of which in the feeding of a family is well known to all, especially to those who do not possess the luxury of a family cow.

I have noted with some curiosity the light appreciation here evinced of the cow, or rather of the amount which her produce contributes to the food of the family. Indeed it is only rarely that one hears the cow mentioned in conversation or discussion as to the supplies of food amongst the small farmers of Ireland. Milk is not estimated here at anything like its full value as an article of diet, nor is it as a rule turned to the best account for this purpose. Nevertheless these small farmers do derive a substantial amount of food for their families in the form of cows' milk, and, with the exercise of a little intelligence and care in cooking, the milk might be employed so as to counteract the bad quality of the potatoes.

But the most gratifying feature in the modern history of the congested districts of Donegal is the development of subsidiary industries, such as knitting, spinning, and weaving, sprigging (or flowering muslin), and shirt-making. In the extension of these industries marked progress has been made in recent years, and the material comfort of a very large number of families has been thereby substantially improved. The making of homespun tweed and flannel is an old industry here, and it is now pursued in the homes of thousands of the small farmers. Many of the farmers turn all their own wool, or more, into cloth, the whole process of manufacture, including carding, spinning, and weaving, being carried out by the farmer's family in his own humble cottage. In many cases

one man weaves for several families, and an expert hand at this work can earn from 3s. to 4s. 6d. per day.

Many who have no sheep of their own buy wool and manufacture it into cloth; and those who own sheep have such a keen appetite for wool that they clip the poor creatures twice a-year—a practice which, no doubt, adds to the comfort of the farmer and his family, but leaves his flock poorly clad for the winter.

The amount which the families can earn at this work is very considerable. It could not be called high wages, but it gives employment in the homes of the people in the winter months, when such employment is much needed. It is certainly an excellent way of utilising the wool grown on the farms; for, by manufacturing it into a good class of homespun cloth, the farmer can turn a shilling's worth of wool into half-a-crown. I have seen a large quantity of this homespun cloth in Donegal, and although I cannot pretend to speak authoritatively upon its quality, I may say that it not only looks well, but it has the appearance of material that should wear well. It is used chiefly in ladies' dresses and summer suits for gentlemen, and there is a fairly good demand for it at from 1s. 6d. to 2s. 6d. per yard, the width of the piece being about 27 or 30 inches. London is the principal market for it, but considerable quantities have gone to the United States, where, it is feared, less will go now on account of the increased tariff.

The home-made flannel sells at from 1s. to 1s. 3d. per yard, the same width as the cloth. At carding and spinning for these materials, women can earn 6d. or more per day. For more than twenty miles along the seaboard, from Ardara towards Carrick and Killybegs, this industry is prosecuted on a very large proportion of the small farms, and I have been assured by those intimately acquainted with the business and with the country that there is plenty of scope for extension.

Stocking-knitting is another industry of great importance on many of the small farms of Donegal. In the districts around Gweedore and Glenties it has been introduced and developed, with great benefit to the inhabitants. For instance, one gentleman in Gweedore pays about 300 women for knitting stockings over £1000 a-year, or more than £3 each; and

this is earned during the winter months, when there is little or nothing else for them to do. This gentleman gives out the yarn, and takes in stockings twice a-week. He pays from 6½d. to 8½d. for knitting a pair of socks, and from 1s. to 1s. 6d. for long stockings. This is higher than the usual rate, as fine work is required. These stockings go to a London firm, and their agent here told me he had just heard that they could take a much larger supply of the stockings if he could get the knitting done. Similar praiseworthy efforts have been made in this district by Mrs Ernest Hart, who has established a woollen factory with a moderate degree of success.

Then the quiet little inland town of Glenties, situated in the midst of a mountainous country, has long been a centre of much activity in this cottage industry. One firm here, Messrs D. & H. M'Devitt, have for many years been paying from £2000 to £5000 per annum in wages to women on the small holdings in the surrounding country for knitting stockings, gloves, jerseys, &c. They sometimes employ as many as 4000 women; but as it is chiefly yarn of a coarse quality that is knitted here, the rate paid is very low—only 1s. 6d. per dozen for socks. A woman can knit two pairs of these in one day, and many children, who would otherwise be adding nothing to the family income, earn a trifle at this work. This enterprising firm also gives encouragement to the manufacture of homespun.

In the Carrick district, which is also much congested, a knitting factory is conducted by a London firm, and has been of great benefit to the people. Shirt-making, for which the ambitious and historical city of Derry has become so famous, has been extended from that centre into the wilds of Donegal, where it is taking root rather slowly. It is an industry, however, which might be developed with great advantage to the people, who are in want of employment. Sprigging or flower-ing muslin is likewise a means of employment for a large number of women and young girls on the small farms of Donegal. It will thus be gathered that in these cottage industries the small farmers of this county have the opportunity of substantially enhancing the returns from their limited holdings.

In addition to these cottage industries, which give much useful employment to the women, but little to the men, there are other extraneous sources of revenue which add not a little to the comfort of the Donegal peasants, and which are nearly all capable of expansion. Comparatively little is now done at fishing and kelp-making, but with the extension of railway communication likely to be carried out, both these industries might be developed to great proportions here.

The most fertile source of external revenue, however, is the labour which is obtained in Scotland and East Donegal in the harvest season. Thousands of men go from the small farms of Donegal to Scotland for harvest work every year, and they each bring back from £5 to £8—in some cases even more, when they go for the turnip-thinning, haymaking, and grain harvest. From many farms two or three men go to Scotland for this work. I happened to know of one case in which the farmer and his two sons have this year returned with £25 to their home in Donegal. The young women and lads go in large numbers to East Donegal for the harvest work, and these also bring back a few pounds to help the family in tiding over the long period of idleness in the winter season.

With the view of providing labour for the people in the congested districts, and of developing the country, the Government has given grants for the construction of railways from Donegal to Killybegs on the southern coast, and from Stran-Orlar to Fintown and Glenties in the interior of the county. These railways are to be made by public money, and will be handed over to existing companies, who will maintain them in working order, and run, at least, two trains each way daily, Sunday, of course, excepted. The whole of the receipts go to the companies, who can hardly fail to derive benefit from these "feeders." The advantage of the lines to the districts opened up by them will be very great, both in the employment given in their construction and in the stimulus they will impart to the development of the local resources.

That the material condition of the small farmers of Donegal has undergone marked improvement during the past ten or fifteen years is well known to all acquainted with the county. Evidence of this, as well as of the altered customs of the

people in their living, is afforded by the greatly increased quantities of bread-stuffs, tea, and sugar imported every year into the congested districts. It is notorious that the peasants are extravagant in the use of tea and sugar, and it is stated on good authority that it is the more expensive tea which is for the most part consumed here. The large extent to which bread-stuffs are now employed in the families on the small farms of Donegal will be surmised from the fact that in the course of the twelve months ending with June last close on 2300 tons of flour and 2800 tons of Indian meal were shipped from Londonderry to the ports on the Donegal coast—all this in addition to the considerable quantities conveyed thither by road and rail. From one shop in a small town in the heart of the congested districts over 600 tons of flour are sold annually. These facts are significant, not only as indicating an increase in the "purchasing power" of these small farmers, but also as betokening the gradual dethronement of the faithless "pratie" from its much too prominent position in the dietary of the people.

I have remarked incidentally that certain parts of Donegal are more seriously congested now than at any former time. In spite of all the hard lessons taught by years of distress, and all the efforts put forth against it, subdivision has gone on continually, and is still taking place. In several of the parishes in the poorer parts of Donegal there has been a marked increase in the population since 1841. In a few cases, in about the poorest parts of all, the increase has been little short of 20 per cent. These subdivisions occur by one or two sons marrying and settling down in a humble hut on a portion of their father's holding, and by-and-by each division has to maintain as large a family as had been reared on the entire farm. The landowners have striven hard to discourage this grave improvidence, yet it goes on in defiance of them. Many of these subdivided holdings have never been recognised by the landowners, the original farm standing in the estate books in the name, perhaps, of the father of two sons, who now hold the land in equal portions, divided by themselves, and practically forming two distinct farms.

It is a remarkable fact that even in the very poorest districts there is an active demand for any of these small

holdings which may by any chance become vacant, or the tenancy of which may be offered for sale. It will be surprising to many, I daresay, to learn that the "tenant right" of these small holdings should possess any saleable value—that any one would be willing to pay down hard cash for the right to become the tenant of holdings so often described as incapable of bearing any "economic rent." Be that as it may, the fact is that as high as 80 to 100 years' purchase have been paid in recent years for the "tenant right" of small farms in the congested districts of Donegal. Common prices are 35 to 45 years' purchase—that is, a tenant who pays, say, 30s. annual rent, receives from £50 to £67 to go out and let another man into his place. Such is the desire of the Irish peasant to be the occupant of a small piece of his native land. It is a misfortune to himself and others that he uses it so badly when he gets it.

X. THE YEAR'S CROPS.

It will have been observed that my letters hitherto have dealt with the poorer districts of Ireland. I have devoted my attention chiefly to the congested districts, for the reason that it is only in these that the failure of the potato crop could cause anything approaching a famine. It will be readily understood, however, that the character of the potato crop in the better favoured parts of Ireland, as well as in England and Scotland, will have an important bearing upon the results of the deficiency of the crop in the congested regions. It is obvious that if there is an abundant supply of potatoes within the British Isles, the shortcoming of the crop in any particular part will not be so serious as if the crop had been deficient throughout the country generally. It is also of importance to consider the character of the agricultural year as a whole, for this, too, will have an influence upon the districts that have been overtaken by misfortune. At this stage, therefore, it may be useful to introduce a very few notes regarding farm crops in general, and the potato crop in particular, in other

parts of Ireland. I have recently travelled through a large extent of the principal agricultural districts of Ireland, and have taken some trouble to supplement my own observations, by intelligence derived from trustworthy sources. And although in this letter I am giving information part of which I have not had an opportunity of verifying personally, I feel quite justified in saying that it may be regarded as trustworthy.

Throughout Ireland generally the weather during summer, so wet and sunless, was unfavourable to the interests of the farmers. Upon the whole, however, the harvest has been a good one. Wheat suffered from the excessive rainfall and lack of sunshine; yet, in the great majority of cases, it is giving a full average yield of grain. In exceptional cases, chiefly on imperfectly drained lands, it is quite one-fourth below the average. The barley crop is a bulky one in Ireland as well as in Scotland. The quality has sometimes been better, but on most well-managed farms the yield exceeds the average.

This has been emphatically an oat year. Not often, indeed, is a better crop of oats grown all over the United Kingdom than has been obtained this year. The oat crop delights in a good deal of moisture, and will thrive with less sunshine than either wheat or barley. In Ireland, in particular, there is this year a remarkably rich and abundant crop of oats. On the whole it is, perhaps, about the best that has been grown in the poorer districts for a dozen years. Only in rare exceptions is the yield of oats below the average, and on the great majority of farms it is considerably over the average.

Similar remarks might be applied to the crop of turnips. A good year for oats is seldom a bad one for turnips. In almost all parts of Ireland there is an excellent crop of turnips this year. It is decidedly above the average, and this means a good deal; for wherever in Ireland the turnip crop gets anything like fair treatment, it usually affords a bountiful return. Both the climate and soil are favourable for root culture. The bulbs continue growing longer through the autumn than in Scotland, and I believe heavier yields of Swedes are occasionally grown in Ireland than in any other part of the United Kingdom.

But while this is true, it is only part of the truth. The

Irish farmers as a rule, especially the tenants of the smaller holdings, do not bestow sufficient care upon the preparing and the cleaning of the turnip land. It is not stirred so thoroughly as it ought to be, and too much licence is given to noxious weeds. On this account the average yield of turnips over Ireland generally is by no means great. Last year the average for the whole of the Green Isle was stated officially to be just over 13 tons per statute acre, and that was nearly 2 tons in excess of the average in 1888.

Mangels, which cannot be grown with success in Scotland, thrive admirably in Ireland, and form a valuable addition to the farm crops, especially where dairying is pursued extensively. Mangels usually yield a ton or two more per acre than turnips, and this year the crop is very nearly as good as the crop of turnips. On the small holdings, especially in the midland and southern counties, mangels give an excellent supply of food for cows wherever they receive anything like decent treatment.

There is a bulky crop of hay all over Ireland this year. In most cases it is decidedly above the average, and only in exceptions below it. With the dripping character of the climate, haymaking is usually a precarious business in the Emerald Isle. This year it was extremely so, for there was more "dripping" than usual. The dry weather and bright sunshine of September came in time to save much of the hay crop, which lay in jeopardy at the end of August. The quality in many cases is not first-class, but the supply is abundant.

In the north of Ireland the flax crop is one of great importance, and there has rarely been a richer produce from this plant than has been obtained this year. It was both rank and even, and will give a large return of fibre. As to pasture, the supply of it has been exceptionally abundant. It would have been more fattening in a warmer season; yet stock have thriven fairly well upon it. Still, it has not been a good year for graziers. They bought in a dear market, and have been selling in a cheap one.

Apart from the potato, then, as to which something will be said presently, the year 1890-91 will be a year of plenty in Ireland. It should, on the whole, be a good agricultural year, giving plenty of food for man and beast.

One other crop which luxuriates admirably in Ireland deserves a word. *Weeds* are everywhere plentiful as a rule, I daresay above the average, both in quantity and quality! Give a weed "half a chance" in the genial climate of Ireland, and it will grow well. It usually gets a full chance, and it grows amazingly. On the richest grazing-lands of the large farms it is just as abundant as on the poor tillage-land of the smaller holdings. Does the average Irish farmer ever dream of what he lets run to "waste in weeds"?

A few words now as to the potato crop. What it is on the small holdings of the congested districts has been pretty well indicated. How has it fared in the other parts of Ireland? Various, but on the whole much better than the appearance of the tops six weeks ago led most people to expect. In a large extent of the better-farmed parts there is an excellent crop of well-grown potatoes, showing little or no disease. It is only in exceptional cases that the yield could be said to exceed the produce of an average year, but over a very large extent of the country it approaches very nearly to the average.

Almost invariably where the land is of fairly good quality, in good heart, well drained, and the crop skilfully and carefully grown, there is a tolerably satisfactory return, rarely more than 20 to 30 per cent under the average. On wet soils the crop has suffered most. There is a great extent of imperfectly drained land in Ireland, and this in a season like the past is ill suited for potato-growing. In County Down, where the land is, as a rule, worked more carefully and more thoroughly, perhaps, than in most other counties in Ireland, the crop of potatoes is wonderfully good. In many parts here it is even over the average, and little damage has been done by the disease. The tubers are well grown, and are of excellent quality when cooked. These remarks apply especially to Champions and Magnum Bonums. The latter variety has lately been introduced extensively into County Down, and the results from it this year are most satisfactory. In most cases it has excelled the Champion. The older sorts, such as Skerry Blues, have not done so well in County Down. They are on many farms small in size and considerably injured by disease.

In the adjoining county of Antrim the crop is more variable.

In several parts here it is from one-fourth to one-third or more under the average. On the drier, better-managed land, and where it was planted early, the crop is not far short of the average. As a rule, in County Cavan the yield is under the average. In some cases it is deficient by from 40 to 50 per cent, but in most instances the crop is turning out better than had been expected. In the north of Ireland generally the supply of potatoes is considerably below that of last year, when it was far in excess of the local requirements. It is by no means seriously deficient, however, and large quantities are now being exported to England and Scotland.

In County Dublin the potato crop varies greatly, but it is, as a rule, fairly satisfactory. A common experience is to dig a little under an average yield in bulk and find from one-sixth to one-fourth touched with disease. In Kildare the crop approaches an average in a few cases where the land is exceptionally good and well farmed, but it is badly diseased in many parts of this county. On wet soils here it is just as bad as in any part of the country—imperfectly grown and much damaged by disease in the tubers. King's County has fared rather better. The crop as a rule varies from one-half to three-fourths of an average yield of sound tubers. The quality when cooked is not satisfactory.

In Queen's County the crop is most erratic in its character—fairly good on one farm and very bad on its neighbours. On the wet, poor lands the disease has done much damage. On dry, good land there are some excellent crops of Magnum Bonums in this county; nearly an average in bulk, and almost free from disease. Curiously enough, on some of the very richest land in County Meath the crop is very seriously injured by disease. This is notably the case on land worked in regular rotation. On the other hand, on fresh land on which potatoes have not been grown before for several years, and are now grown after lea oats, the crop here is, as a rule, very good indeed. It is almost an average in bulk, shows few traces of disease, and is of moderately good quality when boiled. In Westmeath there is, as a rule, about one-third of an average crop, with a small proportion of diseased tubers. In some cases it is worse; in others better. The crops in the counties of Wexford and Wicklow vary from rather less

than one-half to about two-thirds of an average, with some exceptional cases in which, with disease and imperfect growth, there will be little, if any, more than one-third of an average yield.

Upon the whole, then, the Irish potato crop of 1890 will be considerably short of the average, but will not be so deficient as was at one time expected. I have seen estimates in which the supply of sound potatoes was given at half that of last year. I am inclined to think it will considerably exceed that. And it should be remembered that in an average year Ireland grows far more potatoes than it requires for its own consumption. Then, in England and Scotland, although in certain parts of these countries also the crop is deficient, there is a very large supply of sound potatoes. Taking the United Kingdom as a whole, the supply of potatoes this year is evidently ample for all its probable requirements.

XI. RECAPITULATION AND CONCLUSION.

Now that the survey of the potato crop in the congested districts of Ireland has been completed, it may be of interest to draw together the threads which were picked up. First, as to the extent of the deficiency in the crop. In every district this varies considerably. In the most severely afflicted parts, such as the seaboard of West Cork, the wet, ill-cared-for soil of Galway, and the still wetter and equally worn-out lands of Donegal, the crop, I think, could not as a rule be safely stated at more than from 30 to 40 per cent of an average yield of sound, eatable potatoes. In certain cases, probably on one holding in eight or ten, the deficiency is still greater. In just as many instances the produce of eatable tubers would be as high as from 50 to 80 per cent of an average crop. The cases of entire failure are few and far between.

What quantity of food, then, will these small farmers have lost in the deficiency of the potato crop? In a moderately good year their gross produce of potatoes would average about 3 to 4 tons. This year in the worst parts they, as a rule,

are not likely to have more than from 1 ton to 2 tons of potatoes that are suitable for consumption by the family. Many, no doubt, will have more; a few will have even less. It has to be noted that in an average year most of the small farmers grow considerably more potatoes than they require for food for their families. Pigs and poultry are largely fed upon them, and often the cows have a small share, while small quantities are sold, or exchanged for groceries and Indian meal or flour.

It is notorious, indeed, that in years of plenty, potatoes are used on the small farms of Ireland in the most lavish and improvident manner. It is but right that in considering the actual extent of suffering or loss which the contraction of the food-supply from the potato crop may inflict upon the small farmers, these facts should be taken into account. It may be assumed that in a year of scarcity a ton of potatoes may be made to "go much further" than in a year of plenty,—this, too, without the family suffering any more serious discomfort or inconvenience than is involved in the practice of wholesome economy. Although it may be the case that the great majority of the small farmers in certain congested districts of Ireland will raise from $1\frac{1}{2}$ to $2\frac{1}{2}$ tons less sound potatoes this year than in an average year, it does not follow that they have lost that much of essential food for themselves and their families. They have assuredly been overtaken by a very serious misfortune. The sum of their loss, or rather, their actual suffering, however, will not, or at any rate need not, be so great as would be represented by the proportionate shortcoming in the potato crop. If they would promptly close up the ordinary channels of waste, and use the supply they have got with the strictest economy and care—in particular, if they would take a little more than ordinary trouble in cooking the potatoes and presenting them on the table in palatable forms—they would not be so badly off as the percentage of deficiency would indicate. They might make the ton and a half go as far in feeding their families as a couple of tons or more would carry them in years of plenty. A ton and a half of potatoes will supply a family with 10 lb. daily for 336 days.

A word here as to the cause of the deficiency in the potato crop on these small Irish farms. The dull, wet, sunless weather

which prevailed during the greater part of the summer was undoubtedly the chief and the primary cause. It brought in its train a visitation of the potato fungus, *Peronospora infestans*, varying in severity and not quite universal. The wretched systems of culture pursued on most of these small holdings intensified the untoward influence of both the weather and the disease. The three combined have brought about the grave calamity which has overtaken so many of the small farmers of Ireland. The proportion of the mischief arising from each cannot be precisely defined. I am decidedly of opinion, however, that the mysterious and much-abused fungus has had less to do with the calamity than either the bad weather or the bad systems of culture. The last-named must get the lion's share of the blame. No doubt had the weather been favourable, the potato land on these small holdings, wretchedly ill-treated as it is, would have given a ton or two more produce per acre. It is equally true, I think, that if the potato crop had been grown on these holdings in anything like proper or advantageous conditions, the bad weather and the fungus could not have done a tithe of the mischief they have brought about.

We have seen that when the potatoes were planted early in the season on well-drained, well-tilled land, sufficiently manured, and kept moderately free from weeds, the crop has, as a rule, been fairly good—about two-thirds to three-fourths of an average crop, with only a small percentage of diseased tubers. In particular, on dry soils in airy situations very little damage has been done by the disease. On the other hand, where the crop has been grown in less advantageous conditions—on wet, poor land, worn out and “potato sick” by too frequent cropping with potatoes, chock-full of the grossest weeds, and manured very sparingly—the produce, as a rule, is sadly deficient. Even here the loss is not due so much to the actual destruction of the crop by the fungus as to the deficiency in the development of the tubers. That this deficiency in growth arises mainly from the unfavourable conditions under which the crop is grown on the majority of these holdings, cannot for a moment be doubted.

These points I have noted particularly, and I emphasise them here, for the reason that in a contemplation of the

recurrence of a potato plague in Ireland they seem to me to possess very grave importance. The seat of the mischief is the bad system of culture. So long as this continues, a potato plague may be expected to follow every wet season. If the disease accompany or succeed the inclement weather, which it would be very likely to do, the disaster would be all the greater. But even with little or no disease, a wet season such as the past would be sufficient to seriously curtail the crop of potatoes grown in such conditions as those under which it is raised on the vast majority of the small farms of Ireland. What inference is to be drawn from this? That by hook or crook these conditions of potato culture should be radically altered. This must take place if Ireland is to be saved from periodical distress.

There is much talk as to the propriety of the Government giving the small farmers new seed, to be paid for at certain intervals. This would be a temporary relief to those who will have to eat what would otherwise have been used as seed. But there is no permanence in this remedy. To distribute costly seed to be planted in the miserably ill-conditioned, ill-cared-for, "potato-sick" land which is waiting for it, would seem to be doubtful policy. It may tide over the difficulty for a year or two; it will not remove it. The only remedy of any reasonable degree of permanency and trustworthiness would be the introduction amongst these small farmers of a better system of culture—of such a system as would give the potato something like a fair chance of holding its own against the influences which oppose its healthy development. How this improved system could be introduced on many of these small holdings is a matter of extreme difficulty. There are various means, however, by which improvement might be effected, and the subject is one which demands most serious and careful consideration. But it lies outside the subject-proper of this inquiry, and I cannot conveniently further discuss it here.

What are the prospects as to famine? This is the question of most immediate importance. I shall not presume to speak upon it with absolute decision. It is a delicate question, surrounded with difficulty and with not a little uncertainty. My object has been rather to elicit facts than to draw inferences.

Yet it will, perhaps, be expected that I should indicate the impressions which I formed from what I saw and learned. Actual distress cannot be general. It was, indeed, only in exceptional cases that I discovered any symptoms of approaching want. The small farmer who has at least one cow, a fair stock of poultry, a pig or two, a ton or more of potatoes, a small patch of turnips, and three or four small stacks of oats and straw (perhaps thirty to fifty bushels of oats), and an ample supply of turf for fuel, can hardly be regarded as on the brink of starvation. The great majority of the small farmers have more than one cow, and most likely also several sheep. Then, one or more members of the family may have earned a few pounds by labour in England or Scotland, or in other parts of Ireland. And in Donegal, at any rate, several shillings may be obtained weekly by knitting, spinning, weaving, sprigging, or shirt-making. In those families to which these remarks would apply, there can be no danger of real famine or of anything approaching it.

In those families which are not possessed of a cow, have lost the greater portion of their potato crop, and have little support from able-bodied men, there will undoubtedly be varying degrees of want. Towards spring many of these may require assistance to stave off starvation. There has been much discussion as to how this relief should be given. There is a consensus of opinion amongst intelligent men of all classes and in all parts of the country against the giving of absolute charity in a wholesale fashion as in 1886, or, indeed, in any fashion excepting through the ordinary channels employed for the relief of the poor. I have heard warm sympathisers with the people assert that they would almost as soon see famine stalking the land as have the people again exposed to such degrading, pauperising, dishonest practices as occurred in connection with the relief given in 1886 and 1879.

In all the congested districts there will be during the winter a vast amount of unemployed labour—men who are well able to earn all the assistance their families are likely to require. The cry is for work for this unemployed force. By the extensive schemes of railway extension which the Government have sanctioned, and have under consideration, this will

be provided to a very large extent. By other works, such as road-making and land improvement, additional employment may be given. There is therefore little likelihood of serious privation overtaking any very large section of the Irish peasantry through the deficiency in the potato crop.

Nothing is further from my desire than to misrepresent or minimise the calamity which has befallen the small farmers of Ireland. It seems right, however, to point out that this calamity consists solely of the deficiency in the potato crop. In regard to all other sources of food-supply and income they are as well off as in average years. The great majority of them have lost about a ton and a half to two and a half tons of potatoes. A few have lost rather more; a good many considerably less.

The rent of these small holdings seems, as a rule, to be very moderate. In a vast number of cases it is so small as that it could hardly affect them greatly either way whether they paid it or not. On one property which I visited in Donegal there are over 800 holdings of about 10 to 13 acres, with 3 to 5 or more acres arable, and the right of pasturage on the adjoining mountains. The rent of these averages just over 17s. per annum. I was assured on excellent authority that on this same property, as over this part of the country generally, the amount annually spent on tobacco for smoking would average from 40s. to 60s. per holding. More than three rents blown away in smoke!

XII. THE POTATO FUNGUS.

It has been thought that a fitting termination to the letters on the potato plague in Ireland would be a few notes regarding the particular fungus which periodically plays such havoc with the potato crop. *Peronospora infestans* is its scientific name. It is one of those mischievous agencies which would seem to be for ever prowling about ready to seize upon struggling objects, leaving only the fittest to survive. A

strong, healthy potato plant, grown in advantageous conditions as to soil, climate, and weather, can defy all the *Peronosporæ* that ever existed. A weak plant in unfavourable environments falls an easy prey to its fungus enemy.

It may be assumed that the germs of the disease are ever present. With conditions congenial to fungus development they come forth in myriads, devastating the potato crop in their progress. These congenial conditions are damp, dull, calm weather, and a moist or wet soil enveloped in mists morning and evening, and—if I may use the phrase in this connection—deficient in ventilation. The fungus generally delays its coming till about the last ten days of July. I have been assured that it appeared this year in some parts of Ireland as early as the first week in that month. It is more than probable that my informants may have mistaken its cousin-german *Peziza postuma* for the *Peronospora infestans*. Be this as it may, I saw enough to make it certain that the latter had begun its destructive work earlier than usual this year. I likewise inferred from the traces of its handiwork which I came across, that while it had begun early, it was not, as a rule, so rapid in its progress as one would have expected from the character of the season. In this remark I refer only to Ireland. Amongst the early potatoes in the south-west of Scotland it ran its ruinous course with all its wonted rapidity. The truth is, I firmly believe that, wet as was the summer, and congenial to it as are the conditions under which much of the potato crop is grown in Ireland, the outbreak of the fungus in the Green Isle this year has been of a mild type, hardly, except in a few limited localities, so virulent as to assume the character of an epidemic.

The life-history of this fungus, in so far as is necessary for practical purposes, may be told in a very few words. It is believed that the fungus invariably begins its attack in the leaves of the potato plant. There it is first seen in a delicate white bloom, accompanied by dark blotches caused by the spawn of the fungus having pierced the leaf and set up putrefaction. These early traces will most likely be seen in greatest profusion in the lower or drooping leaves, which may be covered with moisture and are not exposed to the drier air playing upon the upper leaves. If the climatic conditions are

favourable to the fungus, it will now develop rapidly, ramifying throughout the leaves, blasting them as it proceeds, and sending into the atmosphere an offensive odour too familiar to potato-growers in recent years. The power of reproduction possessed by this mysterious fungus is so wonderful, that with a favourable temperature (from 60° to 68° Fahr.) and a moist atmosphere one growth or germ will in a few days multiply ten thousand times. The spores or germs of the disease are so light and fine that they float through the air, while by insects and birds they are carried about in vast numbers. The disease will most likely have begun at only one or two centres, but by the germs carried from plant to plant in a moist breeze it may rapidly cover the entire field. It may even pass from one field to another, for in a dull misty morning or evening the tiny but deadly germs may be conveyed long distances. From the leaves the disease spreads successively to the leaf-stalks, the stems, and the tubers. The latter may be also reached by the spores or germs falling from the leaves and being carried thence through the soil by moisture. The spawn of the fungus would seem to have no difficulty in piercing the skin of the tuber. When it has done so, it consumes or rots the cells and corrodes the starch, and ultimately may reduce the entire tuber to a black mass of rottenness.

In this last stage of its active course of destruction the fungus provides means of continuing its life. It produces myriads of "resting-spores" which lie dormant during the winter and spring, and carry on the disease to the crop of the succeeding year, which in its turn passes the fungus through another round of its curious life, to be handed on again from crop to crop as before. It is believed that every part of the fungus excepting these resting-spores perishes with the plants upon which it has been developed. These resting-spores, however, would seem to be possessed of amazing vitality. They live through the winter and spring in decayed potato material, ready to throw out new growth in the following June.

It is extremely desirable that farmers should make themselves familiar with the life-history of this destructive pest. If they do so they will be the better able to contend against

it. Many remedial measures have been tried. Those which have been found most useful in preventing or mitigating the onslaught of the fungus are—(1) Earthing up the potato drills with a deep covering of earth, with the view of preventing the fungus from passing down the stem or through the soil to the tubers; (2) cutting off the diseased potato-tops before the fungus reaches the tubers; (3) removing and burning all dead and decaying potato-stems, leaves, and tubers, especially after a crop which has been attacked by the disease; (4) planting varieties which have been known to be exceptionally successful in resisting the disease; (5) growing the potato crop under such general cultural, sanitary, and manurial conditions as will ensure to the fullest extent possible the healthy and vigorous development of the crop; and (6) careful selecting and storing of potatoes to be used as seed. As yet no certain prevention or absolute remedy has been discovered, but all these measures have been carried out with advantage.

The Jensen system of earthing-up has been extensively tried, with results which have been variable. The general conclusion regarding it would seem to be, that if carried out carefully and at the proper time, immediately the first symptoms of the disease are seen, it will most likely have the effect of greatly mitigating a serious attack of the disease. In many cases, however, it has been tried with no avail, and in most instances it has been found to have a marked tendency to lessen the yield of fully grown potatoes, increasing the proportion of small unmarketable potatoes to such an extent in not a few cases as to render the crop unprofitable. The practice has never come into general use, and very few persevere with it. Still when it can be done without serious injury to the potato-tops, it might be well to resort to the protective moulding when a vigorous attack of the disease is threatened.

The plan of cutting off the tops when the fungus appears will most likely stop its progress. It is a cure, however, which may be worse than the disease. If the leaves and stems are removed the tubers will cease growing. The starch, of which the tuber is so largely composed, is first formed in the leaves, and if these are prematurely removed the result

must be a deficient crop of tubers. Nevertheless some resort to this plan, thinking it preferable to secure a small crop of immature potatoes than to rely upon what the unchecked disease might leave. It is recommended as a further precaution, that when the tops are cut off, the cut ends of the stems should be sprinkled with dry lime.

Experience has proved conclusively that certain varieties of potatoes are for a time more successful in resisting the fungus than others. The potato, as we now know it, is a highly cultivated plant, living a decidedly artificial life, and therefore liable to lose vigour and stamina unless tended with the most perfect care. Varieties which are long in use become impaired in constitution and fall an easy prey to the fungus which delights to feed upon them. On the other hand, new varieties of exceptional robustness repel the disease with unusual success. A good illustration of this is afforded by the Champion potato, which, after several years of remarkable immunity from disease, is at last showing weakened powers of resistance. The obvious lesson from this is, that the raising up of new varieties of marked constitutional vigour should be encouraged by every possible means.

The fifth remedial measure mentioned above is one which may be specially commended to farmers. Unquestionably the strength of the crop to resist the fungus, or its liability to injury from an onslaught of the disease, may be powerfully influenced by the conditions under which the crop is cultivated. It is true beyond all doubt that whatever tends to impair the healthy growth of the plant, or weaken its vitality, assists the fungus in its attack. It is well known that for the fructification and free propagation of the fungus on the potato plants a considerable amount of moisture on and around the potato plants is essential. Indeed nearly every part of the fungus speedily perishes in dry air, heat, or frost. For its existence water or moisture is absolutely necessary. From this we draw the practical lesson that potatoes should as far as possible be grown upon well-drained land, in a dry, elevated, bracing position. From this the small farmers of Ireland might learn that the cutting of a drain or two in their small potato-patches would not be lost labour.

Manuring is another important point. If the soil is poverty-

stricken, and the application of manure insufficient for the immediate wants of the crop, the produce can be neither abundant nor constitutionally strong. And the manure to produce a sound, vigorous potato must be well balanced, supplying all the essential elements of plant-food in due proportion. Moreover, the land must not only be dry and well manured, but it must also be well tilled, so that the tubers may have a free, well-aired soil in which to ramify and develop.

And is it too much to expect that the crop should have the land to itself? If it should perchance have to raise 5 to 10 tons of weeds at the same time, could it be reasonably expected that the soil (especially if it should happen to be steeped in water, and miserably manured) would produce a vigorous crop of tubers, such as would be well fitted to combat the fungus? Those who have perused my letters will observe that this picture, faintly indicated, does not misrepresent the prevailing conditions under which the potato crop is grown on the small farms of Ireland. We have it on the authority of the late Professor Baldwin, that "it is no uncommon thing to find 10 tons of weeds in an acre of potato ground" in Ireland. I presume it will hardly be contended that potatoes grown in these conditions are likely to be well fitted to resist the fungus. The fact that even in an average year the small farmers of Ireland dig only from 3 to 4 cwts. of potatoes for every cwt. of seed which they plant, indicates fairly well the miserable conditions under which the crop is grown. Is it any matter for surprise that epidemics of the fungus should be of frequent occurrence on these holdings? It is with the potato as with a human being—deprive it of wholesome food and healthy sanitary surroundings, and disease will speedily ensue.

An essential and useful precaution against future outbreaks of the disease is to gather and destroy all potato refuse—leaves, stems, and rotten tubers—that may be left on the field when the crop has been raised. In all probability, if the disease has attacked the crop this refuse will be swarming with the germs of the disease. On many farms it is the practice to gather this infested rubbish into the dung-heap. It is a bad practice. The sooner it is given up the better. It is practically nursing the enemy—keeping it warm and vigorous for

future attacks. The rubbish should be either burned, or buried beyond the reach of the plough.

The storing of the potatoes to be used as seed is a point of some importance. If there has been any disease in the crop from which the seed has been taken, only such tubers as appear to be perfectly sound should be selected. They should be stored in perfectly dry, airy places, with ample means of ventilation. Seed potatoes should never on any account be stored on wet ground, and they should not be covered up till they are perfectly dry. A pit in which potatoes have been allowed to heat and decay is a veritable hotbed for the fungus. *Peronospora infestans* is an insidious enemy. It must be kept at bay at every corner.
