



Pictou Dec 20, 1845.

Mr Titus Smith,
Dear Sir,

A copy of your circular having been handed to me, I send you a few facts and suggestions which may perhaps aid in discovering a remedy for the mysterious potatoe disease of the present year.

The disease, as observed in the tubers, appears to have commenced immediately under the ~~the~~ skin, and to have penetrated in irregular lines and patches towards the centre. Under the microscope, in the earlier stages of the disease, the fluids of the part affected appear thick, opaque and brown; and in some instances the walls of the cells appear broken; the starch globules seem to be uninjured, but are sometimes observed to be gathered in irregular groups around diseased spots. In a more advanced stage of the disease, a fungoid substance, resembling that of dry rot, is produced, and the cellular tissue of the tuber is wholly disorganised. The disease, as observed in this Province, seems to be identical with that which prevails in Europe, and to consist in a chemical change or putrefaction of the fluids of the tuber, consequent on the diminution or destruction of the vitality of the plant. The appearance of fungi & animalcules in the tubers, seems to be a result rather than a cause of disease.

In this part of the Province, the leaves of the Potatoe began to be affected in the last week of August; but believing that the injury was caused by slight frosts which occurred at that time, I did not examine the leaves or stalks. I have, however, no doubt that the disease commenced in the tops, since after their destruction, it continued to appear and make progress in the tubers.

The crop suffered in soils of every description, though in wet soils the injury was most extensive, and in the more elevated parts of the country, and in burnt land least so. The statements made respecting the influence of the time of planting are very contradictory. When the first injury occurred the tops of the potatoes were blackened, over patches of country including every variety of soil, and various modes of cultivation, just as occurs after an early autumnal frost.

All varieties, even those procured from seed a few years ago, were affected, though some of those most recently introduced here, for example the New Brunswick blue and Rohan, are stated to have suffered less than others; to some other lately introduced varieties, however, this does not apply.

All the facts that I have collected, indicate that the disease has originated in

land, which are often watery and imperfectly ripened, are found more useful for change of seed than the pampered tubers of richer soils and more genial climates, and these latter are also much more easily injured by external causes.

3 In the case of the potatoe, there is a third and less easily remedied cause of degeneracy. In propagating any vegetable solely by offsets or cuttings from its roots or branches, we may be considered rather to perpetuate one plant than to produce new individuals; and hence it happens, that plants propagated in this way for a time much exceeding the natural duration of the life of an individual of the species, become worthless or die out, and new plants must be produced from seed. This is well seen in grafted trees and varieties of flowers propagated by roots or cuttings; which are often observed, after some time, to diminish in value and become extinct from mere old age. In this point of view, nearly all the cultivated varieties of the potatoe are very aged, and must in consequence be weakly and liable to disease, especially to all those diseases which are caused by diminished vital energy.

It may be objected to this view, that the

disease at present prevalent is of so recent origin,
when the ordinary varieties of the potatoe have
long since attained great age. In answer to
this it need only be observed; that though the
present disease has been only lately noticed by
farmers, it has probably been gradually increasing
in past years; and besides, dry rot and curl
which are related to the present malady, have
long prevailed, and have been partially prevented
only by change of seed from one locality to another,
and other expedients likely to produce some effect
in counteracting the degeneracy above supposed.
It may also be objected that Turnips are said
in Great Britain to have suffered from the rot; it
appears however that the disease in turnips
is very local, and of a different kind from that
which affects the potatoe, being internal and
perhaps caused by rain penetrating the crown of
the plants. A third objection is, that seedling
varieties of the potatoe have been affected as
much as others, With respect to these varieties
however, it may be observed that they have
been procured from seed produced by aged
plants, and these farther weakened by producing
tubers as well as seed in the same season. Seeds
thus produced must partake of the debility of

of the parents, and consequently must inherit its liability to disease.

Assuming then that this progressive deterioration of plants cultivated by division of the roots, is the original predisposing cause of the unhealthiness of the potatoe in modern times; what remedy can be proposed. This is pointed out to us by nature; which has given to the potatoe the power of producing seed, in order that worn-out plants may be constantly superseded by new and healthy individuals. Since however we can obtain seed only from old and diseased plants, we must cultivate our seedlings till they produce seed, & on this to obtain new tubers and repeat the process till the taint from the original stock is entirely removed. We must in short, pursue the same method which in Belgium has been so successfully applied to the improvement of fruit trees. In applying this method to the potatoe, the following process, proposed in Scotland, may be found serviceable.

Having prepared a bed, lay the potatoes on the surface and cover them with a little loose earth. When the stems have attained some height support them by tying them to sticks. When ^{the} young tubers have attained the size of small peas, wash away the earth from the plants, so as to expose the

roots; then pick away the small tubers, being careful however not to injure the roots. This will cause the whole energies of the plants to be devoted to the production of seed. Collect the seed and sow it in the next spring; select the finest tubers produced and plant them as before. Preserve their seed and with it repeat the process. The third and fourth sowing would without doubt afford some healthy and hardy varieties which would repay all the trouble.

This method is tedious and its results would not appear for a few years; but if the potatoe continues to be affected by rot, recourse to it will become unavoidable; while even if the present disease should disappear of itself, new varieties procured by the above process would be found highly useful. For these reasons it may be worthy of the consideration of the agricultural Board, whether a small sum might not be usefully expended in employing a skilful farmer to conduct a series of operations of the kind above described, and in thus establishing a nursery from which new and healthy varieties of the potatoe might be spread over the Province.

Sincerely wishing that your inquiries may lead to the discovery of the means of averting the utter destruction which seems to threaten our most valuable esculent root,

I am yours truly,
W. W. Dawson

Some general predisposing cause affecting nearly all potatoes alike, but variously modified by external circumstances, ~~and~~ having its development induced by numerous secondary causes. Believing the investigation of these causes to be of the utmost importance in any attempt to discover the means of preventing the recurrence of the disease, I shall endeavour to state as shortly as possible the conclusions at which I have arrived on this subject.

Of the external and local causes, of the disease, those which seem to have attracted most attention, are the attacks of parasitic fungi & animalcules, wetness of the season and soil, early chills and frosts immediately succeeding sultry weather. These and other causes of a similar nature, have without doubt operated most powerfully on the development of the disease; but they cannot account for its almost universal diffusion, nor for its appearance at this time, when in former years it has not been produced by these causes. These external causes of disease must not however be neglected, since they point to the utility of early planting in dry soil, of cultivating early varieties, and of using manure in as thoroughly decayed a state as possible.

If we wish to discover the ~~few~~ original cause of the injury, we must have recourse to more generally operating agents than those just noticed. Of this kind we have the vague surmises of some persons that the disease may be caused by atmospheric malarialia, and the known fact that the potatoe degenerates or becomes run out by long cultivation. The former of these may at once be discarded as improbable and unsupported by any evidence; but the latter is a fact of great practical importance in reference to all the diseases which have in recent times affected the potatoe. It presents itself in three aspects.

1 It is well known that all useful plants, when long cultivated on the same soils and with the same treatment, degenerate. This is true of the potatoe and hence annual change of seed has, in Scotland especially, been practically employed with great success as a remedy for canker and rot.

2 The potatoe, in a state of high cultivation, has a tendency to accumulate in its tubers an excessive quantity of starch to the injury of the vascular parts of their roots, and consequently of their vitality and reproductive power. For this reason the potatoes of boggy and elevated