

THE VITALITY OF BURIED WEED SEEDS

Remarkable Experiments on Old Lands

(From "Country Life")

SINCE the days when Adam first tilled the earth the cultivator has always met with opposition from weeds or plants native to the soil. In spite of every effort, the competition is as keen to-day as ever it was, and if the husbandman relaxes his vigilance in any area, the weeds gain the upper hand in an incredibly short space of time. If a well tilled arable field be left to its own devices even for a single year, the invasion proceeds so rapidly that, unless prompt action be taken, many years will be necessary to effect a clearance. But where do all the weeds come from? Do they spring from seeds buried in the soil, or are they transported by such external agents as wind, animals and birds?

If a field has been under the plow for some time the problem does not present much difficulty, as it is natural to assume that, as weeds seed very freely, sufficient of their seeds are present in the soil to colonise the area at the first opportunity. The difficulty arises when one considers the case of grass land which is plowed up and which becomes covered with great crops of arable weeds, especially charlock or poppy. These plants are rarely seen in grass fields, and yet many farmers take it for granted that they will appear in battalions when grass is put under the plow, even though the land be "real old pasture."

Careful enquiry, however, often discloses the fact that the term "old pasture" is very elastic, and that usually the land has been under arable cultivation at no great distance of time. When this is the case, it is quite probable that the seeds have been buried in the soil and have retained their vitality until, by the plowing they have been placed in circumstances favorable to germination. It is impossible to believe that the great quantities of charlock or poppy seeds are carried by birds or wind. For one thing both plants ripen their fruit and shed their seed during the summer.

If the plowing up of the grassland takes place in the autumn it is obviously impossible that any number of seeds should be transported to the freshly turned soil, as they would have been shed and scattered at an earlier date. The only natural solution of the difficulty is that of buried weed seeds, and the question at once arises as to how long such seeds can retain their power of germination under such conditions. Many of the older records of the longevity of

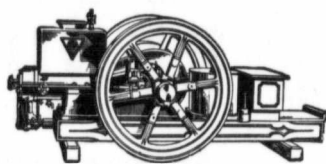
seeds are unreliable, as it has been proved that fraud was practised for sake of gain, but some scientific writers have obtained proof that many seeds can live longer when buried in soil than when kept in dry storage.

Recently experiments have been carried out at Rothamsted, whereby some definite proof has been obtained of the length of time that seeds can remain buried in the soil without losing their vitality. Samples of successive inches of the top foot of soil in several fields of known history have been obtained by means of a steel box open at both ends. This was sunk in the ground at the selected spots, and the enclosed soil was removed inch by inch to a depth of 12 inches, and placed in separate pans or boxes. The greatest care was taken that no crumbs of outside soil fell into the samples; and every other source of contamination was guarded against.

Several holes were tested in each field for the sake of accuracy, and the pans were placed in a greenhouse and kept moist for about eighteen months. After a very short interval seedlings began to appear, and as soon as they were large enough to be recognized they were removed to make way for later comers. Most of the soil was obtained from old arable fields which had been laid down to grass for periods varying from ten to fifty-eight years. True old grassland was represented by Harpenden Common, and by some park grass that is known to have been under grass for at least 300 years, and a check for comparison was provided by samples from land that is under the plow at the present time.

The flora that arose in the pans showed most striking variations, which were closely correlated with the varying history of the fields from which the samples were taken. The soil under present day tillage produced great crops of typical arable weeds, representative of the numerous species that colonise the open field. In this case not a single weed was observed that is associated with grassland and not with tilled soil. The old grassland samples, on the other hand, were populated exclusively by grassland plants, and arable weeds were conspicuous by their absence.

The common is largely grazed by sheep and cattle, and comparatively few plants have any opportunity of ripening their seeds, whereas the park grass is mown every year and more seed production is thus possible. The difference was reflected in the experimental results as far fewer seeds were found buried in the common soil than in that from the park grass.



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