

in rope, and economy of manual labour ; and, for tolerably level tracts of large open fields, must, I conceive, at present displace all competitors. But farms consisting entirely of large well-arranged open fields are the exception ; and when we consider the irregularities of surface on the majority of farms, the obstacles offered by small enclosures, irregular quality of land, wear and tear in moving machinery, danger of priming, &c., from the frequent variations in the level of the engine boiler, absorption of power in climbing hills, difficulty of traversing soft or boggy land, complexity of the machinery placed in the hands of farm labourers, and last, but not least, the first cost of the apparatus, we shall see that the Direct System, while possessing many advantages, labours in very many farms under insuperable disadvantages. Fowler, in his disc anchor windlass, and ingenious adaptation to the ordinary portable engine, has met some of these objections, by diminishing the cost and the weight. Coleman's mode of working with a pair of implements is included in this system, and exhibits a simple method of avoiding the necessity for a heavy anchorage on the headland opposite to the engine ; but the fact of its requiring a duplicate of all implements, employed is no slight objection, and the absence of any arrangement for coiling the rope, the small size of the drums, and the difficulty in the way of efficient portering must add fearfully to one of the most serious items in steam cultivation—viz, the wear of the rope ; while the general objections to the Direct System apply to it equally with Fowler's.

The roundabout system, in which a portable engine is stationary and the rope laid round the field, was well represented by Smith, Howard, Fowler, and others, each employing a different kind of windlass, and all, as well as the implements deserving especial attention. For simplicity and general adaption no system can at all compare with this ; the entire apparatus being comparatively inexpensive, and so understood by a labourer of ordinary intelligence. The engine employed is similar to that used for thrashing, and there are few fields in which it is not easy to find some spot well adapted for placing an engine and windlass, and conveniently accessible for the water-cart ; while in many cases, the expense of water-carting may be avoided, by the formation of a tank or hole to retain or reach the water. The remainder of the apparatus, such as anchors, snatchblocks, &c., is simple, effective, portable, and little liable to get out of order ; add to this the small amount of first outlay required, and the advantages of the roundabout system can hardly fail of having great weight with the practical farmer in making his decision ; but at the same time he must not lose sight of the fact, that, under it, the manual labour is more, and the length of rope exposed to constant wear greater than under the direct system.

In these remarks I have abstained from noticing many details in the several systems, because it has been my aim to avoid all that might tend to lead the mind away from the first great question : " Which of the three general systems is the best for my own farm ? " This being settled we have advanced one most important step, as it only remains to determine which maker we shall go to, and which of that maker's plans we shall adopt, which questions can only be resolved by each individual for himself, with special reference to his lease, his farm, and his purse. My own farm I cultivate with Howard's apparatus, for which I consider it specially adapted, but of this I am convinced—that where no obstacles are presented in the shape of a lag end, a lease, annual tenancy, or the incapacity of the farmer, there are, comparatively, few farms in the country, on which one or other of the systems of steam cultivation might not be adopted with very great advantage.

My present object is not so much to consider the novelties in steam cultivation as to urge its general importance, and to rouse farmers from that torpid state in which so many yet remain with reference to it, *especially our heavy-land men*, whose land, horses, and pockets press so earnestly for the invaluable adjunct of a steam cultivator.

Before concluding, allow me to draw attention to one important feature in the trials, which gives rise to much misconception in the minds of farmers.

Provided the implement does not penetrate into the hitherto uncultivated "pan," we can, by inspection, form a tolerably near guess as to the power required to move it at a given rate, and if it does not penetrate below, we know that *each extra inch enormously increases the power required*, especially if we have tried our best at subsiding by horse-power. But when we enquire what power is employed, we are often met by the answer, "Oh, a common 8 perhaps 10 horse-power engine;" and if further enquire the pressure, "About 45lbs;" generally the reply. Perhaps in some cases it is about 45lbs., but how often is it about 80, or 90 lbs., or even more ; and I suppose even balance springs and even registers do always like to contradict the assertions of the employers.

I have before said that the *quality* of work done depends on the implement rather than on the system ; but the *quantity* of work done by any given implement must, to a great extent, depend on the system, and what we want to know is—1st. What power really exerted by the engine, not merely nominal horse-power ; 2dly, How much that power is absorbed by the intermediate machinery, such as clip-drum, windlass, pulley, tight and slack rope, &c ; 3rdly, What effective pull remains for the implement, be it plough.