3. Engines which move along headlands and apply their power to the implements by means of wire ropes.

4. Engines which remain stationary while at work, and draw their implements by means of wire ropes.

Quite a number of schemes under each of these heads have either been introduced to public notice, or have been patented. We will now proceed in general terms very succinctly to notice the claims of the several schemes. With respect to the first-named system,—engines which move over the land,—they certainly possess the advantage of exerting their motive power directly on the implement which accompanies them. Besides the objection of their immense weight, however, in passing over arable land, the consumption of fuel and water, owing to the unevenness of the surface of the soil and greater friction, would certainly be four fold that of a stationary engine; while the cost of repairs would probably be ten times the amount. The second scheme,—laying down rails all over the farm,—costs too much at the outset Probably £20, or even £30 per acre, would scarcely defray the introductory expenses of the farmer adopting this system. The third method is that perfected by the late Mr John Fowler, of Leeds,—an honoured name, which is immortally associated with the history of steam cultivation. Fowler's system, and that of the Messrs. Howard, of Bedford (shortly to be noticed), share pretty equally the patronage and popularity of the agricultural world at the present day. The rivalry between those firms has not always been free from little acerbities. Each system, however, possesses so many excellent characteristics and recommendations that it would be invidious in us to attempt to settle the question of superiority. In Fowler's system the engine unquestionably employs its power more directly, and requires a shorter length of rope, than where the engine is stationary at one point, as in Howard's method. Still there are drawbacks, of some weight, to Fowler's apparatus. When the soil is at all wet "the passing of a heavy engine along the headlands, and the necessary haulage of fuel and water after it, destroys in a great measure the fertility of the ground traversed, and leaves a good deal of hard work subsequently to be done by horse-power, in bringing the land to a tilth. Again, in hilly countries the engine is at work sometimes on a steep ascent, and sometimes on as steep a descent, at times inclining to the right, at others to the left." A little reflection will render it apparent that the cost of keeping the engine in repair, under these circumstances, will be much greater than where the engine is stationary, and always working on the level.

We now come to the fourth and last system of our list. It is almost unnecessary to state that this is the method adopted by Messrs. Howard, and illustrated in our last issue. The leading objections urged against this plan are "the extra length of rope required, and the loss of power by the employment of pulleys round which ropes are passed." Both of these objections have, in our estimation, been considerably exaggerated, but the limits of the present article do not admit of our discussing the various points presented for an exhaustive inquiry of the subject. The advantages claimed for this system may be briefly enumerated as follows:—Moderate prime cost, little expense incurred by repairs, simplicity of construction, more easily managed by ordinary farm labourers, and, finally, that an irregularly shaped field may be ploughed and cultivated as well, and almost as quickly as a square one. The large illustration in our last issue exhibited the arrangement of the ropes and apparatus in the case of a rectangular field; while the cuts accompanying the present article, show three methods of accommodating Howard's steam tackle to fields of irregular shape.

STEEPING SEED WHEAT.—There are many methods of steeping, brining, and liming seed wheat, and they are all intended to prevent the smut.—*Morton's Farmer's Calendar.*

Thick Sowing, Shallow Ploughing, and Weediness.

The experience of 20 years has taught me that thick sowing inflicts an enormous aggregate loss on British agriculture, and that loss is greatly aggravated by the ordinary shallow ploughing; for, as I have before said, the thistle and other strong and deep-rooted weeds are merely decapitated by ordinary ploughing, and, consequently, our laid barley crops give unmistakeable evidence that those weeds have still possession of the soil and subsoil. They stand towering above almost every barley crop, while in my own, scarcely one can be found, owing to my second or under plough (drawn by four strong horses) having, when prepared for the root or cabbage crop, destroyed them by tearing them from their stronghold in the subsoil. The weediness of Great Britain costs the country millions annually. These weedy intruders take the lion's share of the food intended for our crops. But look at the difficulty of harvesting such crops, especially in a wet harvest time as this is. These green weeds not only tend to delay the drying and carting, and heat the stack, but supply a stock of seeds for future crops. The sample is also frequently diminished in value some 2*s.* or 3*s.* per qr., because these flat laid weedy crops almost always turn out a bad, light sample. But why are these crops laid flat? Mind, I do not object to heavy crops, whose weighty heads bow them down, and appear to be laid; but, if you examine them, you will find, as mine are, that the stems are not horizontally flat, but that they are merely bowed or arched, leaving plenty of room for circulation of air through those arches, which never allow the heavy heads to come near the ground. They are, although laid, actually reposing on arches formed by the strong reedy stems of their neighbours. These stems, stiff, glassy, and reed-like, stand erect as stubble, and resist your steps when walking, very differently from the soft, spongy stubble of thick-sown crops. Mark the difference in growth of a thick and thin-sown crop when the warmed soil in spring stimulates vegetation. In one case the crowded stems rush upward in a vertical struggle for light and air, which, being excluded from their stems in later growth, cause those stems to become spongy, soft, and deficient in that glassy covering which not only protects the circulation of the plant but keeps the stem erect. In consequence of over-crowding, down goes your crop prematurely, and up come your weeds, which have now lost the shade of their competitor, the corn. Light, frothy straw, and lean, miserable kernels follow as a natural consequence, and are certain preludes to a low price and loss of profit. But then, say the advocates of thick sowing, "But I like a thick crop at harvest." I reply "So do I; but what is the true test of a thick crop?—not bulk, but weight, both of straw and corn. Experience has taught me that I always get a greater weight of both by thin sowing than from thick." It is easy to understand why thick sowing has so strong a hold on the agricultural mind, and why it is no longer justifiable in practice. Before drills were invented, broadcasting was a necessity, and considering the variability in ploughing it is easy to understand that much seed being too deeply placed never came up, while much of it near the surface was food for birds. The farmers might well feel anxious about exact depth of furrow, and carefully laying them, as well as having a sower "cunning in his art." But drills and iron steel-toothed harrows have changed all this, and rendered a very much smaller quantity of seed absolutely necessary, for each seed in well cultivated ground is, by the drill, placed in a proper position to grow; therefore let my old practical friends take the hint, and adapt themselves to an altered state of things. Even now I hear that many of our north-country friends, over the Border and near it, cling to broadcasting, thus depriving themselves of the benefit of that labour-saving machine, Garrett's horse-hoe, which takes 7 feet in width, and by which from 12 to 20 acres a day may be both cleansed and cultivated. Owing to the removal of trees and fences, drainage, and generally improved cultivation, our seeds are no longer subjected to such dangers as formerly.

It is curious to trace how much accident has had to do with diminishing the quantity of seed. When the drill was first introduced there was the desire to put in the same quantity of seed as when broadcasted, not considering how perfectly the drill placed every kernel, while by broadcasting much was wasted. An old friend in Warwickshire gave me an instance of this accidental diminution. When the new drill came, he ordered the man to take care to put in plenty of seed (their usual quantity being 3 bushels of wheat) The man saw so much seed coming down the pipes that he "thought there must be a plenty." The field was of 20 acres, and when the master returned at midday he found they had only put in 6 pecks. Great was the dismay and doubt whether it should be resown. However, the other half of the field was drilled with 3 bushels. At harvest the thin sown beat the thick by more than a quarter per acre, and ever since six pecks has been the quantity of that neighbourhood. Surely we ought not to wait for an accidental discovery when it is so easy and inexpensive to make comparative trials on a small portion of each field. I have been led to make these remarks by my practical experience in thin sowing and deeply cultivating It must be borne in mind that I allude to strong, heavy land, well drained and kept free from weeds and properly manured, and in the cereal county of Essex. Let each man judge of his own soil and climate, and take into consideration all other circumstances. It would be impossible to lay down an inflexible rule for all soils and all climates; but, at any rate, I am satisfied that by moderate and careful experiments we shall all gradually arrive at a considerable diminution in the quantity of seed sown, especially as our agricultural practice approaches nearer to perfection. As I have often said before, the quantity of corn produced does not mainly depend upon the quantity of seed sown; it is the natural or artificial fertility of the soil that causes the young plant to multiply its shoots or stems in spring. The half peck per acre of wheat on my 9-acre field is now cut and in shock, as well as the two lands of two sorts of wheat on each side of it sown with my usual quantity of four pecks. The half peck appears, both in straw and grain, to have the advantage, but we shall test them carefully, by weight and measure, both of corn and straw. This is a singular instance of an extreme case, because we gave it up for lost, in the winter; but in the spring it branched out horizontally close to the ground and then up rose vertically, after forming the curve of resistance below, from 10 to 28 strong reedy stems from each plant, each stem having a fine ear averaging fifty kernels, being an increase of from 500 to 1,400 for each kernel This is somewhat different from the average of the kingdom—9 for 1, as described in Mr. James Caird's admirable book. My men estimate the general yield of the field at 52 bushels; if so, the increase of the half-peck will be 52 bushels, or 416 kernels for one. There certainly must be something radically wrong in our agriculture, when we find 9 for 1 as a general average increase. In Russia, where there is no hoeing, and where weeds and wheat grow in company, the average increase is from 3½ to 5 for one, according to the quality of the soil. The question, as a national one, will be better for a thorough agitation. There is something practically absurd in supposing that we can put in a screened kernel of wheat in properly prepared ground, and only obtain from it a quarter of an ear, or ten kernels, and that it must only produce that one ear I believe that the same principle holds good for wheat as for turnips, trees, or animals.

Put ten animals for nine months on a pasture which only contains food enough for one, the consequence would be death to most of them, and half starvation for the survivor—so it must be with plants: we know it is so with trees and turnips. The want of air and light, as well as other food, is destruction. We never see two trees in close proximity without observing that they turn their backs to each other, and extend their arms in opposite directions; few or no branches are formed between them. It is not the want of earthly food that causes this, but the want of that aerial food, without which neither plants nor animals can flourish. Let my practical friends ponder on this important matter, and let them remember that whenever they wish to raise a new stock of corn, they carefully put one kernel in a hole, in well cultivated ground, and rejoice in obtaining an enormous produce. A good field of wheat should, in early spring, look as flat as if its stems were glued to the ground, every shoot pushing out horizontally, before it takes its vertical movement.

Agriculturists admit that this is the proper appearance, but they can never obtain it by thick sowing and crowded plants, for then the early movement is an upward struggle for light and air (as we see in a crowded fir plantation), and down they all go, too often prematurely, and ruinously, their spongy stems rendered soft by the absence of light and air, being unable to sustain the impact of rain or wind. I need scarcely say that a thin sower should select perfect seed—heavy as well as bulky—and freed by the blowing machine from all seed weeds, or light corn. This wet, warm harvest there will be an unusual quantity of sprouted grain useless as seed. I have heard farmers say that, as a matter of economy, they sowed tail corn. This would never suit a thin sower, and it is certainly a very false economy. Last year one peck per acre produced the largest crop on my farm, both of corn and straw, viz., 56 bushels of wheat and 2¾ tons of straw per acre, accurately measured and weighed. For careful experimental dibbling I am indebted to Mr. Hallett's simple dibble.—*J. J. Mechi, August, 1865.*