a little more elevated than the fire-box end. With plenty of time, and any quantity of picks and shovels at command, it is, of course, quite possible to plant a stationary engine as firmly and as level on a hill side as on a bowling green. When, however, the engine has to advance a few feet along an inclined headland every two or three minutes, the level of the boiler must inevitably be altered at each onward movement. In such a case, the engine-man is entirely at the mercy of the slope he is working on, for the presence, or absence, of water upon the crown of the fire-box. At the same time, the possible over-heating, or proper cooling of the tubes, and the objectionable priming which takes place when the water level is too high at the fire-box end of the boiler, are entirely beyond his control.

In their engine, as represented in our first illustration, Messrs. Howard have entirely overcome those difficulties. Their arrangement simply consists in placing the boiler, with its cylinder and crank-shaft, *across* the frame work, instead of lengthwise, as in Fowler's engine. By this method the form and generally acknowledged advantages of the locomotive boiler are retained; while, on the steepest hill, the steam space is undiminished, and the water level never varies sufficiently to leave any part of the fire-box or tubes uncovered. "In case the field should slope in two directions, that is, if the surface inclines at right angles to the headland, one side of the carriage frame would be lower than the other, and consequently the boiler (set across it) would 'pitch.' But then headlands are rarely, if ever, flat; and the engine driver, by choosing the right or left-hand side of it, can, in most cases, ensure that the wheels on one side shall be level with those on the other." The engine is mounted upon three wheels, and hence it stands steadier on ground that is not perfectly level.

Both Howard's and Fowler's locomotives are adapted to work on the double system. By this arrangement, two engines are employed at the same plough. They work opposite to each other, and move forward on the headland as the work proceeds. By the employment of two locomotives, "anchor," "snatch-block," and "windlass" are unnecessary; while a considerable saving of time is effected. When they finish a field, one of them instantly marches off with the plough, cultivator or harrows, and the other winds up the furrows length of rope, and quickly follows. In commencing the next piece "there is nothing to be lowered into a hole in the hard ground, no heavy apparatus to be lugged round the field in a cart or waggon, to be left in instalments at the several corners, no rope to be trailed round the same journey by a pair of horses, no windlass to be carefully placed by 'backing' and 'locking,' &c., the wheels dropped into holes purposely dug, held by stakes driven down into the ground, attached to the engine by adjusted rod or chain, and the engine-wheels secured in position by wedges driven beneath their felloes. One engine enters the field, takes the implement and trailing-rope to the far side, while the other engine takes up its position on the near side, and without more ado the tillage begins."

PEAS AS A LAND-CLEANING CROP.—My peas yielded about thirty bushels per acre. But they are full of bugs! Can nothing be done to get rid of this pest? Late sowing is said to be a remedy, but it is often worse than the disease, as, if dry weather sets in, the crop will be light. A good, smothering crop of peas will sometimes clean the land as well as a summer fallow; but a light crop leaves it foul. Notwithstanding the bugs, I think that I have had no more profitable crop this season than these peas. I had forty-six loads of vines, nicely cured, bright and sweet, which I consider more nutritious than over-ripe and poorly-cured clover hay. There was an immense growth of vines, and they smothered the weeds. I ploughed the land twice after the crop was off, and as the Deacon says, it looks as well as a smart summer fallow, and in his opinion will give better wheat than if it had been "sun burnt."—*Harris's Walks and Talks.*

Rice and the Rice Crop.

The New-York *Journal of Commerce* has the following interesting article on this subject:

This grain, which is one of the staple productions of our country and an important article of commerce, it has been estimated, forms the principal food of at least one-third of the human race. Where it originated is not now known, but from time immemorial it has been the chief subsistence of the common people, and a prime article of diet with all classes in Southern and Eastern Asia, where it has been most extensively cultivated. It has been supposed by some that it was in common use amongst the ancients, and that it is mentioned in Scripture under a name that is not familiar at the present day. Its very early use is beyond question, but we have no definite accounts regarding it, as we have of some other grains, nor is it found, like wheat for instance, among the remains of antiquity. It probably had its origin somewhere in South-eastern Asia, and from there was introduced into Southern Europe, where it is cultivated to some extent, but it has never been produced or used so largely in any other part of the world as in India and China. It was first introduced into this country by Sir William Berkeley of Virginia, in 1647, who received half a bushel of the seed, from which he is said to have raised the first year 16 bushels of excellent rice, and thus the cultivation of it was commenced and carried on. It has been raised to some extent in Virginia ever since, but the amount has been very small compared with that raised in some other southern States, and especially South Carolina, which has produced 75 per cent of the rice crop of all the States. Various accounts are given of its introduction into South Carolina, one of which is that in 1694 a Dutch brig which put into Charleston left about a peck of paddy (which is rice in the husk,) and that Gov Smith distributed it among his friends for cultivation. Another account states that it was introduced into Charleston from Canton, in 1772, by John Bradley Blake. The production of rice in South Carolina rapidly increased, and in 1850 it amounted to 150,930,613 lbs., the production of the whole country the same year being 215,313,097 lbs From these States the cultivation of it extended into others, Georgia ranking next to South Carolina in the amount produced. It is generally supposed that a hot climate and wet soil are essential to its cultivation; but it is raised on high and dry land, and the range of latitude in which it can be successfully cultivated is very wide. Irrigation, however, greatly increases the crop, as does a warm climate; and there is probably no part of the world better adapted to it than the low marshes of South Carolina and Georgia. On account of the extreme unhealthfulness of these regions, it has always been thought that negro labour alone could be employed, the blacks having the same immunity as in Africa from the fever which is deadly to the whites. This opinion is undoubtedly correct, and unless the blacks continue the cultivation of these rice plantations, they will probably run to waste, and the amount of the crop in the country be greatly reduced below that of former years, when there was nothing to interfere with its production. It is needless to say this would be a great calamity, as the rice from South Carolina and Georgia is undoubtedly the finest raised in any part of the world. At the great Industrial Exhibition at London, in 1851, the rice from South Carolina exhibited by E. J. Heriot, received a prize medal and was pronounced by the jury to be "magnificent in size, colour and clearness," and the American was regarded as much the finest in quality of any on exhibition. Its importance as an article of commerce may be inferred from the fact that the amount exported from this country has reached as high as 212,983 tierces in a year.

It may be interesting to some of our readers to have an account of the mode of cultivation adopted on the rice plantations where the overflowing of the land is resorted to. The land selected is that which is above the reach of tide or salt water, and which is not liable to the heavy freshets that flood the country on the upper parts of the rivers, as the irrigation must be completely under control. The land is prepared by the erection of dykes and digging of ditches, and divided into as many separate fields as can be separately attended to, in the various operations required, in a single day, each field capable of being shut off from all the rest. The fields are ploughed in the fall or early winter, and overflowed when the weather is warm. In March the land is drained and kept dry, and when in a proper state to work, it is harrowed or hoed, and trenches for the seed are made 12 or 15 inches apart, and running at right angles to the drains or ditches The seed is sown in the trenches in April, and covered lightly with soil, and then the water is let in upon it through the grates and suffered to stand from four to six days, until the grain begins to swell. The water is let in a second time when the blade is just above the ground, and allowed to remain about the same length of time, when it is thoroughly drained. In about five or six weeks the first hoeing takes place, and a second about ten days later, when the "long water," as it is called, is let on for two weeks, deep for four days and gradually diminishing until it is drained again. When the field becomes dry it is hoed again. On the appearance of a joint it has another hoeing and the "joint water" is put on, which remains until the grain is matured, a period it may be of two months. A few days before cutting, the water is drawn off for the last time. The rice is cut with a sickle, and after threshing another important operation is to be gone through, the removal of the husk or shell, which closely envelopes the kernel, and to which it adheres with great tenacity. This was formerly accomplished by braying it in a morter, and the same course is now pursued to some extent, but mills are constructed in which it is partially ground, without destroying the kernel altogether. The whole is then run through a graduated cylinder sieve, similar to the screens by which coal is assorted, and the hulled rice comes out in three separate parcels or grades, first the flour and fine pieces which have been abraded by milling, then the "middling," and after that the "prime" rice, which consists of kernels nearly or quite whole. The prime rice is subjected to still another process, which is called polishing or brushing, and which is effected by running it through a rapidly revolving wire screen, lined in part with shreds of sheepskin. This removes the flour adhering to the surface of the kernels, and the rice is then ready for market. The prime rice is the rice of commerce. The other portions are reserved for home consumption.

The chemical properties of rice adapt it much more for use in warm than in cold climates. It has a great amount of starch and gluten in its composition, and very little oil, so that its flesh-producing quality is limited. Whether from the knowledge of its chemical properties or as the result of long experience, it has come into very extensive use in the warmest regions of the globe, as in India for instance, where the heat is most intense and long continued. It has always been in much more general use in the Southern States of our own country than at the North, but it is an article of extensive consumption in all the States, and we think it might be still more largely used with great advantage to the general health, especially during the summer season.

The Potato Disease.

THE *Irish Farmers' Gazette* says on this subject:

"During the present prevalence of the potato disease in some parts of Ireland, where Peruvian guano and other ammoniacal stimulating manures are so universally used in the cultivation of this plant, most particularly would we desire to draw the attention of our readers to the following statement of Baron Liebig. Oftentimes, through the columns of the *Gazette* have we directed our readers, previous to the putting in of the potato crop, to substitute the use of the Phospho-guano or other manures rich in phosphates for the indiscriminate use of the Peruvian or highly ammoniacal guano. Year after year have we the sad experience of the potato disease to record. Liebig tells us plainly what should be done to *alleviate* the disease, and field practice has most universally and decidedly endorsed his statement in proof that *phosphates* and *potash*, not *ammonia*, are the elements the potato requires, and must have, in order to effect its healthy and vigorous development, thus providing the plant with the power, in a great measure, to withstand the climatic influence which, in its weak state, it so easily and readily falls a prey to. The statistics of this year will shew that the increased use of strong ammoniacal manures for the culture of the potato is accompanied with increased experience of the disease.

"Though we cannot over-estimate the value of well-saved farm-yard manure for special and judicious application, we think that its *sole* use for the cultivation of the potato is much to be deplored; its proportion of *phosphates* must be increased if profitable results are to be looked for in the potato crop.—Ere another season passes over our heads we earnestly trust that the cultivators of the potato will seek to apply to the land intended for its growth those elements *necessary* and *essential* to its healthy and vigorous development. If the indiscriminate use of ammoniacal manures be continued in potato culture, it will most assuredly be accompanied with that irregular and weak expansion of tissue, at the expense of the quality and strength of vital sap necessary to enable it to withstand the climatic influence yearly brought to bear upon it. As in the case of animal life, so is it in vegetable life—constitutional weakness will be the result in either case if fed upon over-stimulating food."