"Our arrangements for filling our batteries, and drawing off the products as they are formed, are simple in design, and perfectly efficacious in practice; they consist to describe them generally, in a well-arranged system of gutta percha piping, troughs and taps. Our aim in dealing with the difficult matter of making the experimental apparatus of the lecture-room the working instrument of practice, has been to establish a thorough system of electrical engineering; and with what success will be best seen by a visit to our manufactory.

"We have now to deal with the other products of our batteries, *not pigments*; and although we feel great difficulty in placing this part of the subject in a garb sufficiently popular to be easily comprehended, we consider it necessary to advert to it, to render more clear what we may describe as the "profitable" portion of our invention.

"During the working of certain forms of our batteries large quantities, especially when we use nitric acid, of nitrous fumes are given off; these fumes we convey into appropriate chambers and apparatus, and convert to the following uses:—The production of nitrate of potash, and the production of sulphuric acid—substances which it will be seen are made use of in originally exciting the batteries. The hydrogen which escapes from the zinc cells we also profitably employ for the manufacture of acetic ether and ammonia. The pigments, when removed from the batteries, carry with them, of course, a large quantity of spent acid solution. This we profitably employ, after the manner described in our specification, for the manufacture of nitrate of iron, white lead, and plaster of Paris. The acid solutions also contain a large proportion of the salts of potash in the forms of nitrates and sulphates; and these salts are easily separated in the manufacture of the substances just named. It must be remembered that nitrate of potash forms one of the exciting agents in the lead battery, and that, therefore, the saving of this salt is by no means an insignificant feature in the economy of our system. We would, moreover, especially draw attention to the fact, that the potash salts from the prussiates and chromates, added to the batteries for the manufacture of the colours, contribute entirely to the formation of nitre and sulphate of potash, over and above the alkaline salt used as an excitant."

Mr. Watson then comments as follows:—"The difficulty of carrying into the wide and, it may be said, rough fields of practice an invention such as these pages are devoted to, can only be really understood by those who have experienced it. A new field of labour has to be opened, and experience and education can be the only guide of those who may engage in it. Electrical illumination consists not in the mere arrangement of certain galvanic pairs; it requires something more: system, order, and economy, must rule it, as with railways and steam navigation. The successful and permanent institution of telegraphic communication by the same mysterious force, offers the greatest possible inducement for its being taken up in the spirit that it deserves. The laying of the electrical mains, and the arrangement of a system of governors for regulating and measuring the quantity of electricity passing to the different lamps, is as much a matter of engineering as the arrangements of gas and water. It will be easily recognised, we opine, that if the manufacture of the colours which we have described can, in itself, return a profit so large as to constitute a trade monopoly, that the production of the same articles, and the gain of a new power, as an additional source of profit, is a matter worthy of every species of encouragement. We state the proposition thus generally to save ourselves the tedious details of a debtor and creditor statement, although the closest inspection of such that can be given we more than desire and court."

In conclusion Mr. Watson, recapitulates that he is able to produce the electric light steadily and uninterruptedly for any number of hours; that any little inequalities in the action of the battery, which would cause the light to flicker, are entirely removed, and rendered inoperative by his introduction of the magnet as a regulator; that he has the means resident within the lamp itself of increasing or diminishing the light; that the lamp requires no previous adjustment, when the electrode is once fixed, to render it available at a moment's notice; that the electric light has no characters in common with other artificial sources of illumination. It surpasses all other lights in brilliancy. It may be seen from a distance of 30 miles from the place of exhibition; and, what is peculiar, it requires no air to support it, and burns as well under water as it does in vacuo! That for lighthouse purposes it is invaluable. For signalising at sea, ships in convoy, lights of all kinds for vessels, for railway purposes, lighting tunnels, mines, and diving-bells, it has properties and advantages which no other description of light can command. In streets it must, with time and public favour, entirely supersede the use of gas; and for lighting public assembly-rooms, theatres, and spectacles of all kinds, it has only to be made known to ensure its adoption.

Samuelson's Patent Digging Machine.

It is well known that the produce of land cultivated by market gardeners and by cottagers far exceeds that obtained from the same area by the farmer. That excess is obtained chiefly at the expense of increased labour in deep tillage, irrigating, singling, and cleansing. It is only of late that a serious effort has been to assimilate our practice as farmers to that of the gardener. In the growth of root crops the water drill is but just beginning to perform that in the field, the omission of which in the garden would be considered as the height of neglect. In growing corn, we still adhere to the extravagant practice of thick sowing, whether broad cast or by the drill; though we may see in the labourer's allotments how much superior, both in the straw and in the ear, is the crop which he has "dibbled" with one-third the quantity of seed. The value of horse-hoeing is doubted by many who would not allow a weed to remain in their gardens; and we still endeavour to make up by waggon-loads of manure and by tons of guano for imperfect tillage and want of drainage, which permit their most valuable constituents to be washed off the surface into the ditches and streams; whereas by converting our fields by deep tillage into one vast filtering bed for their retention, we should not only avoid this waste, but avail ourselves to the utmost of the valuable dressings that descend with the rains of heaven, the ammonia contained in which, according to our chemists, represents an annual value of quite twenty shillings per acre, estimated at the price of guano.

It is to the element of cultivation, namely the effective pulverization of the soil and preparation of the seed-bed, that Mr. Samuelson the well known agricultural engineer of Banbury, has contributed the invention of his digging machine, which has been for some past at work in that neighbourhood. It consists essentially of several series of slender steel prongs, so shaped in curve and section as to penetrate the soil easily by the mere weight of the framing, which contains them; each series resembling the spokes of a wheel without the tyre, and all the wheels being caused to revolve by the draught of the horses, whilst embedded in the earth up to what may be called their naves. The spokes or prongs bring up the soil, and allow it to fall backward, thoroughly pulverized and mixed, in a form not unlike the backwater from a paddle-wheel. In the upper portion of their revolution they pass between a corresponding number of strong iron bars which scrape away any earth or weeds adhering to