

ability and scientific knowledge. A sincere desire, however, to impart whatever practical information I possess on this important subject, has alone induced me to undertake this duty.

The more the subject of drainage is discussed, the better it is likely to be understood, and it is absolutely necessary to fix its general principles clearly in our minds, to enable us to settle to our work with that degree of confidence which is essential to success in practice.

The records of the application of drainage to the improvement of land go back to a very remote period. We read in the writings of Virgil and others of drainage operations carried on by the Romans nearly two thousand years ago, and they appear to have been familiar with it as a system. Two hundred years ago, Blythe, in his "Improver Improved," addressed to "Cromwell," strongly urged the necessity of carrying out a system of drainage there laid down. In Essex, nearly 150 years ago, furrow or parallel drainage was practised; and about 50 years later, it was applied, to some extent, in several of our southern counties. We hear little more of it until it was again revived, upon a new principle, by Elkington, in Warwickshire, about the year 1770; and after his day, it seems to have lain almost dormant for half a century. Elkington's system being that of tapping springs, sometimes at great depths, and of bringing up the water, as we do in wells, and then carrying it off by an ordinary drain, was not generally applicable, only a comparatively small portion of farm land being subject to wet from this source; and I believe the celebrity which this system procured for Elkington, coupled with a large grant of money from Government, was owing more to his personal ingenuity and skill in carrying it out, than to the value of the principle involved. We may naturally infer that disappointment in its results must have occurred early after its introduction; for its practice generally was soon abandoned, although there was no rival system at that time ready to supersede it. After that period the science and practice of drainage remained in a comparatively quiescent state for nearly 50 years, or from about 1780 to 1830. No doubt, many individual cases of spirited attempts at draining, during this interval, could be traced out; but it was a mere groping in the dark, no principle or system being under discussion, or settled in men's minds. About the year 1830, Mr. James Smith, of Deanston, roused the country from its lethargy, and succeeded in producing what may be more correctly designated a *revival of an old*, rather than a new system. The good he did, however, cannot be easily overestimated, as he inspired an interest in other means of improvement, as well as in drainage; and, by his writings and example, gave a legitimate direction to the capital and en-

terprise of the landholders throughout the country, and caused much labour to be absorbed, with great benefit to the nation, if not in all cases to individuals. But though Mr. Smith was a man of science, as well as of practice, his principles have undoubtedly been lately superseded (by fair reasoning and detailed experiment) by those of Mr. Josiah Parkes; and within the past six years most practical men, who have given consideration to the subject, have had their minds fully set at rest as to the true principles of drainage.

The necessity of drainage is now so generally admitted, that I need not enter at length into its merits. When I state that nearly one-fourth of the area of the United Kingdom, or 20 millions of acres, require drainage—that it would employ 100,000 men for 50 years, and require an outlay of £80,000,000 to accomplish the work—you will see how important it is to have its principles correctly understood, and its practice properly carried out. It may be long before this gigantic task is accomplished; but as upwards of *three millions* has already been granted by Government on loan, and greater facilities given for obtaining private loans for this purpose, we may conclude that capital will continue to be directed into this channel, in an increasing ratio, for national as well as individual improvement, and that it will obviate the necessity which, through the poverty of landlords, or the temporary interest of tenants, has hitherto confined it to such a limited scale, and induced a preference for cheap and superficial, instead of permanent drainage.

It is well established that drainage improves the climate, as well as the soil—that it is equally conducive to the health of beasts as of man—that it gives us an earlier spring, and brings an earlier harvest by at least 10 days—and it lengthens our summer by enabling us to turn our cattle out earlier and to keep them out later. Drainage also eradicates thistles and other weeds, and aquatic plants—cures and prevents rot in sheep, and brings inert vegetable matter into action. It is not, however, an antidote to poverty in the soil, but only brings it into a state of greater fitness to hold and distribute the proper food of plants.

I, and many others, have found that grass land, when drained and immediately broken up and sown with oats, produces, in an ordinary season, a smaller crop, both of straw and grain, than it would have done in an undrained state—that this does not hold good with other cereal or pulse crops; and for all bulbous and other root crops, which delight in vegetable matter, drainage is equal to an ordinary manuring, even the first year, and the soil is ever afterwards much more grateful for manure.

Nearly all manures are inoperative on wet land, and lime actually injures it. Wet clay lands are almost worthless until drained, but none are more grateful for drainage and