

cessary from the gravity of his own body, without much muscular exertion, in ordinary ploughing. On level ground very little muscular power is necessary with common-sized horses, when the dead draught of the plough does not exceed twenty-eight stones. The cart-horse, on the other hand, finds resistance from every direction, and his muscles become trained to act in every direction to meet this resistance. The high-spirited cart-horse, when first put to the plough, generally becomes quite restive, for he has not yet learned what use he can make of his own weight by leaning steadily on his collar; but this he will soon learn when he finds that he is not shaken from side to side, or pushed forward by the motion of the cart: when he feels these things do not annoy him in the plough, the energy of his muscles in meeting them will be relaxed, and will, therefore, be directed to the one forward motion of drawing the implement. From the same physical causes does the saddle-horse feel awkward when first put to the yoke; his muscular powers, instead of being used in carrying, have now to be exerted in pulling; and it cannot be supposed that the animal will make an immediate transition of his powers to serve such a different purpose. Some time must be allowed both the cart and saddle horse until their muscles have arranged themselves for the continuous forward draught.*

The comparative value of horses and oxen, as beasts of labour, has been frequently discussed, and is still a fertile subject of controversy between practical and theoretical men. Numerous calculations and experiments have been instituted from time to time, by different parties, for the purpose of illustrating the advantages and disadvantages on either side; but the question is still far from being satisfactorily settled. Although the horse is, doubtless, better adapted than the ox to the diversity of labours required of working cattle in this country as well as to that degree of dispatch which the farmer deems indispensable to use in the performance of his varied operations, yet the ox may be, and undoubtedly is, in many districts, very profitably employed in drawing the plough. Oxen, it is admitted, are by no means remarkable for the celerity of their motion, or their activity in the yoke; but this circumstance, though always laid hold of as an argument against their employment, is, beyond a doubt, almost entirely the result of mismanagement; for oxen may be trained to go at as rapid a pace at the plough as can well be desired. They are, it is allowed, incapable of continued hard labour like horses; but then they are much more cheaply maintained, they cause no expense for shoeing, and, when arrived at a certain age, they can be fattened and sold to the butcher. Where oxen are employed to any considerable extent for ploughing, it is customary to keep two sets, the one to relieve the other; where this system is pursued, the working oxen are found to fatten almost as quickly, and be ready for the butcher nearly as soon, as the animals which are constantly tied up in their stalls. It is well known, too, that properly trained oxen are preferable to horses for breaking up tough heath-land, containing many stones, as they draw more patiently and uniformly. In many of the small holdings in the north of Scotland, it is not uncommon to see a horse and ox going together at the plough; and a more steady or agreeable pair could not be desired than what they generally make. The small farmers in that locality, who cannot afford to keep more

than one horse, purchase a draught ox about the month of October; and, as he is generally required to work only five or six hours a day during the winter season, he is sold at a good profit after the labours of the spring are over. There is every reason to believe that, at an early period, oxen were generally employed at farm-labour throughout the whole of Scotland; but it is worthy of remark that, in those districts of that county in which the practice of agriculture is allowed to be in the most advanced state, oxen, as beasts of labour, have gradually fallen into disuse. In the Lothians, for example, an ox is never seen yoked to a plough or cart; and notwithstanding all that has been advanced in other quarters in their favour, the Lothian farmers cannot be convinced that the employment of oxen would be for their interest. Whatever of prejudice there may be in this predilection for horses over oxen, it is certainly a strong, though not a conclusive argument, against the latter, that they have been gradually laid aside, as modern improvements in agriculture have advanced.

To execute the art of ploughing in a correct and judicious manner, it is evident that much will depend upon the skill of the ploughman in tempering or setting his irons, to suit the different soils and the state in which they may be at the time of ploughing; and hence a facility of accurately adjusting the plough-irons, that the instrument may have no undue tendency to work too deep or too shallow in the ground, or to take too wide or too narrow a furrow-slice, is of much importance. Indeed, an indispensable qualification of a good ploughman is a facility of adapting his implement to every soil and situation in which he may be placed. The form of the mould-board has certainly a great influence in giving a good appearance to the furrow-slice, and in turning it over into a proper position; but it is also evident that unless the slice has been rightly cut by the coulter and share, it is impossible for the mould-board to rectify the defect, or give the furrow-slice that peculiar form which is found to answer best. The relative positions of the coulter and share must vary according to the texture and condition of the soil, and other circumstances; thus, the particular set found most suitable for stable or half-pulverized land will not answer for lea-ploughing, and vice versa; and the proper set of the plough-irons for light friable soils will not do for ploughing such as are of a strong adhesive character. Experience will be the safest guide to direct the ploughman how to act under these circumstances. In lea-ploughing the great object aimed at is to turn up as high-raised and square-cornered a furrow-slice as possible. This certainly depends in a great measure upon the constructing of the plough; but unless the irons are properly adjusted, and in a suitable state of repair, the sod cannot be cut in that clean unbroken manner which distinguishes good ploughing. In adjusting the share, the proper position is determined by the application of a straight-edge, first to the land-side of the plough, and extending along the left side of the share, and next along the sole-plate. The land-side of the share, when new or newly repaired, should have a slight inclination landward, as the friction of the soil will soon wear it down to coincide with the line of the side plates. In setting the coulter with the share, the former may be about one-fourth of an inch to the left of the latter at the point. This is the general allowance by good ploughmen, but it is subject to much variation.

* See Hunter, on the "Scotch Swing Plough."