first twenty days of December; or, in other words, wheat up on September 1st has a double autumn for a growth before winter sets in; and, indeed, the case is in reality much stronger than this, for, if winter were to set in early, there would be for wheat sown at the end of October little or no autumn growth above-ground. The importance of every day (especially the early days) of September growth can not be overrated. To illustrate this, Miss Hallett made two very accurate drawings, which her father produced publicly. They were taken on December 30th, of two plants of wheat, each from a single *grain*, one of which was up on September 1st, the other on September 19th, and had thus lost the growth (after having come up) of the first nineteen days of September, the development of the earlier being double that of the later. These facts clearly point to the necessity of sowing in August. Nature, too, in shedding the grain it August, seems to indicate it as the proper time, or rather as a not unfit time, or the species would not be perpetuated. Within the present century it was the custom of many English farmers to go to wheat-sowing whenever it rained during harvest. (1)

conducted between the end of August and the 10th of September, at the rate of two to three gallons per acre; for each week later to the end of September, a gallon extra. When observing the unimpeded growth of cereals, there is seen to exist a striking variation in their modes of growth and powers of production. The superiority of some individuals over others is so marked in various ways as to lead irresistibly to the conclusion that it must be hereditary, and on this fact the whole argument for selected seed-grain rests.

Let it not be supposed, from what has been stated, that the use of artificial fertilizers is sought to be prejudiced. On the contrary, if improvement can be secured without them, it will be immensely greater when aided by them. But, while the purchase of good seed of pedigree stock in small quantity, though the farmer bought it at six dollars (Major Hallett frequently obtains five), would be a very economical proceeding, if he does not use more than two gallons, the cost of which would only be one dollar and a half per acre; the buying of common seed at one dollar, and using two to three bushels, involves a greater outlay. Therefore, in proposing this reform, it will be seen that it does not mean spending

BERKSHIRE SOW.

In determining the *space* to be assigned to each grain, we must deal with seed the result of continued selection, for the vital powers of the different grains of ordinary wheat are so *very* unequal that it would be impossible to fix upon any uniform distance. In planting grains of wheat in August, singly and twelve inches apart each way, all the requisite conditions of time and space seem to be best fulfilled, as will be seen further on. Wheat has been planted September 9th, 9 inches × 9 inches, and produced at the rate of 108 bushels per acre. It must be borne in mind at all times that it is a matter for mature study and judgment to correctly apportion the quantity of seed to the time of sowing, *and to all the existing surrounding circumstances.* A large quantity of seed sown early, is just as much opposed to reason as a small quantity of seed sown late, and in fact more so, as in the first case it will become winter-proud and can not succeed, while the season may be such as to enable the latter to do so. As a general basis, the drilling of wheat on a large scale might be

(1) In 1850, it was the custom in the South of England to begin wheat sowing about the 15th of October, except on the Cotswold hills, a bleak spot, where the new wheat in stack in one field was neighbour to the "braireding" wheat in the next. If the winter was mild, the sheep were turned in sometimes as often as 6 times in a season.
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more, but less, on seed. The weeding, if done properly, may cost two dollars per acre; and if, after this, the grower has any money to spend on fertilizers, let him invest it by all means. As a general rule, it may be confidently asserted that what would be saved in the outlay for seed would pay the cost of horse-hoeing.

Considering how rapid is the improvement of the process of selection during the first five years, its effect on the wheat-crop of the country would be enormous. If we take 500,000,000 bushels of wheat as the present product (which is much less than it is), than doubling the crop and adding at the very least fifty per cent improvement in quality to the grain, we should obtain an increase of about $750,000,000, without bringing an additional acre into cultivation. I have not said much of the effect on the corn-crop; but on a crop of 1,750,000,000 bushels, at an average value of 38 cents, it would, if but fifty per cent increase in five years could be realized on 27·5, be astounding. To-day, the area in corn is not less than 65,000,000 acres; 12·50 bushels increase, at 40 cents per bushel, would be five dollars an acre, or $325,000,000: $1,075,000,000 of additional food in the short space of five years would give a new impetus to the milling trade in this country, and the hog-business would grow with a rapidity out of all proportion to its past career. Neither