THE FARMER'S ADVOCATE.

THE FARM.

The Soil and the Seed. Editor "The Farmer's Advocate":

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Soils and crops are inseparable. Crop yields are determined by the amount and availability of the plant food in the soil as much as they are influenced by the character and quality of the seed The maintenance of fertility, the preservsown. ing of good physical conditions, the conservation. of soil moisture, and the use of high-quality seed, are factors of prime importance in the production of any grain crop.

All cereals are soil exhausters ; all legumes are Therefore, in any permanent syssoil enrichers. tem of successful cropping, the culture of clovers and closely-allied species must have a place. The frequent growing of these crops will maintain the productive capacity of our soils so far as the most expensive element of plant food-nitrogen-is concerned. As for the other elements most likely to be present in the soil in limited quantities, the feeding of all roughage and concentrates, and the return to the land, without needless loss, of the manure thus produced, is, perhaps, the most effective system at present practicable on all farms except those where the most intensive systems of cropping are followed.

The time to begin the preparation of land for the sowing of small grains is the preceding fall. With but few exceptions, fall plowing has proven better than spring plowing. Fall plowing prevents the seeding of weeds, makes conditions more favorable for the absorption and retention of rainfall and snowfall, holds injurious insects in check, equalizes farm labor, facilitates the pulverizing action of frost, and enables the land to be seeded much earlier in spring.

For all small grains, excepting peas, the land should be cultivated in the spring as early as it can be worked without injuring its mechanical condition. The amount of cultivation depends wholly upon the land and the season. Deep cultivation is generally preferable to shallow, providing sufficient top-working is given to firm the lower layers of the seed-bed sufficiently to facilitate the rise of moisture by capillarity.

If the area to be seeded is so large that the land cannot be sown as rapidly as the ground becomes fit, it is good practice to harrow it. Harrowing breaks up the crust and forms a dust blanket for the retention of soil moisture. This point, which is of such great practical value, is generally overlooked because so few realize the immense amount of water required to bring grain For every ton of dry matter crops to maturity. produced, wheat requires 350 tons of water; oats, 375 tons; and corn, when the amount lost in evaporation is included, requires 570 tons for every ton of air-dried fodder. The average rainfall during the growing period is, therefore, inadequate to meet the needs of the crops, hence the necessity of conserving, by early surface cultivation, the soil water resulting from fall rains and winter snows.

Failure to get and retain a satisfactory stand of grasses and clovers is frequently attributed to a lack of fertility, whereas, in many cases, the loss is directly attributable to an insufficient sup-

All classes of grains experimented with showed a gradual decrease in yield as the time of seeding was delayed, except barley and peas. To illus-The first seeding of wheat gave an avertrate : age of 38.12 bushels, the second 29.69 bushels, the third 29.58 bushels, the fourth 25.93 bushels, and the fifth 19.63 bushels-a strong argument in favor of early seeding.

On land in good tilth, and in a good state of fertility, two bushels of wheat per acre has proved most profitable. The same rate has proved most profitable. proven best with six-rowed barley. Results obtained with oats, based upon four years' work, with duplicate tests, would indicate the advisability of sowing slighly more than two bushels per acre.

Large, plump seeds have given, on an average, a higher yield than the same number of medium or small-sized grains. While this is true, it does not necessarily follow that, because a man sows only the largest and best-developed kernels, that he can, therefore, afford to sow a less quantity by measure or by weight. A pound of small, plump, graded seed will, because of the larger number of grains it contains, generally give a greater yield than a pound of seed composed of nothing but the largest and hest-developed grains.

Grains sown mixed give a larger yield per acre than grains sown singly, providing two highyielding varieties which ripen at the same time are sown in proper proportions. So far, one and one-half bushels of Mensury barley and one bushel of Daubeney oats has given the most satisfactory returns.

Drilling is to be preferred to broadcasting. The extra yield, however, aside from the case of peas. is, in the average season, and on well-prepared land, not great. Drilling distributes the seed more evenly, and covers it at a more uniform As a result, germination is more prompt depth. and uniform, and a less quantity of seed is re-Weeds are less troublesome on drilled quired. than on broadcast land. Barley and oats, drilled, are much more liable to be injured by smut than when broadcasted.

In dry seasons, grains should be rolled immediately after seeding. Rolling brings the soil in close contact with the seed, thus hastening germination. A light harrow or weeder should follow the roller to re-establish the dust blanket and conserve moisture.

While all grain crops, with the exception of peas, might profitably be seeded down with clover, this practice is by no means general. When grass or clover seeds are not sown with the grain, a stroke or two with a light harrow or weeder after the grain is three or four inches high will prove of great benefit. This is especially true if weeds, such as mustard, are present, as the harrow will destroy myriads of them, without doing The few grain plants serious injury to the crop. which are pulled out will be amply compensated for by the extra tillering induced by the harrowing in those that remain.

Grain-growing is not an exact science. portant as are principles, the prime factor in the entire situation is the grower himself. He must have a first-hand knowledge of his soil, born of a working acquaintance with it. He must be a man who studies the likes and dislikes of his crops. He must know the "how." He must practice what he knows. The necessity of exercising fine judgment in many points, which are all too frequently regarded as of minor importance, must never be overlooked. Here, as elsewhere, applied knowledge of detail counts. L. S. KLINCK. Macdonald College.

prompt in the performance of operations, are truly marvellous, especially if with these important points be combined the growing of the right crops, in the right fields, on the right farms. In other words, the following of proper rotations and of a line of farming suited to the district.

As an example, taking the average crops in Ontario at average market prices, it would be quite possible to more than double the value of the crops in this Province in three or four years, were our farmers able to even fairly well comply with the general suggestions given above.

Entering slightly into the detail of the matter, and following to a certain extent the line of discussion suggested, I might say that we have not found any advantage here, in my division, at least, from the changing of seed. I believe, in the case of potatoes, an exception must be made, since the use of seed grown in the East has prov-We have, however, en highly advantageous. found that certain varieties are much more profitable than others. In our field operations here, no variety of oats has yet been found to surpass the Banner, although many other varieties have been offered and tried. At other farms of our system, however, some new varieties of wheat have been found to be considerably superior to the older varieties, as, for instance, Marquis has proven to be much more prolific and to have other advantages over Red Fife and other varieties grown in the West.

The selection of seed from the varieties commonly grown, paying attention to strength of straw, size of plant, and prolificacy of the same. has shown quite marked results on the farm here. Seed from such selected plants has yielded as much as 20 per cent. more than the average run of seed

Variety, selection, change of seed, etc., may undoubtedly have some influence upon the average returns, but in my personal experience, according to my observations made throughout Canada, and according to the conclusions I am able to draw from other men's work, the great factor making for increase in crop production or falling off in yield is MOISTURE CONTROL. In other words, the better the cultivation of the soil, the greater are the returns likely to be, since cultivation of the soil means nothing more nor less than the control of soil moisture. Once a good variety of crop grown has been fixed upon, care should, of course, be taken, year by year, to make a fairly good selection of seed therefrom, and to see that same is free from weed seeds and impurities. This being done, the farmer may safely neglect the seed question and devote his energies to the proper cultivation of his soil and to careiul consideration of his rotation. To enter into a discussion of cultural methods and crop rotations would probably be inopportune. I cannot refrain, however, from urging upon farmers the importance of following a short rotation, leaving the fields down to hay or pasture but a short time, the growing of no grain crop or hoed crop two years in succession. One year grain at a time is enough, and if one wishes to keep his fields in good physical condition, the growing at short intervals of some hoed or cultivated crop. Our experience here might be summed up in the sentence or statement, " the shorter the rotation, the greater the net profit." however much greater

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ply of soil moisture. In such cases, moisture, not fertility, is the limiting factor in crop production.

Results obtained at many experiment stations, and on thousands of Ontario farms, where comparative tests have been conducted by members of the Experimental Union, have emphasized the importance of growing only those varieties which have demonstrated their ability to meet the requirements of local conditions. The variety or strain, as well as the class of crop, is fundamental. and cannot safely be ignored.

Prof. C. A. Zavitz, after over twenty years careful experimental work with a number of varieties of barley and oats, without change of seed, has proven that, under Guelph conditions, these grains have not only not deteriorated, but have actually increased materially in yield. Several of the leading varieties now under test at Ste. Anne came from this stock. We have acted on the principle that grains, grown under reasonably favorable conditions, if properly screened and fanned, will not run out.

Experiments at Ste. Anne have demonstrated that all small grains, with the exception of the field pea, should be seeded in the spring as early as the ground can be worked to advantage. In conducting this experiment, five seedings were made with each class of grain, and, as the seedings were one week apart, the fifth seeding was made four weeks after the first. The results of four years' work are striking and suggestive Spring wheat, seeded as early as the ground could be worked, without injuring its physical con-dition, averaged 38.12 bushels per acre, while that seeded four weeks later averaged 19 63 bushels, a decrease of 18.49 bushels per acre. due wholly to the time of seeding. The falling off in quality was likewise very apparent. The other grains showed the same tendency, although not so pronounced, oats showing a decrease of 14.43 to cultural operations, giving a little more care bushels, and barley 3.77 bushels per acre.

Soil-moisture Control and Short Rotations.

Editor "The Farmer's Advocate"

The questions you raise for discussion are most timely, and concern matters a proper considera-tion of which, and the careful application of available information, would certainly work a revolution in Canadian agriculture.

In my experience, however, the most difficult part is not the learning how, or knowing when, where and how to do things, but rather the actual doing of them. On the Experimental Farm here, as elsewhere, the actual performance of all operations in the very best way, and exactly the right moment is exceedingly difficult. I am, therefore, quite conscious that it must be very difficult indeed for the average farmer to do everything at the right time and in the right way, according to his best knowledge. However, there is no denying that the only way of keeping the importance of good methods and prompt operation. in mind is to discuss the same, and then inculcate their practice

The farmer's life at certain seasons is a strenuous one, and all the enthusiasm, energy and love of his work with which it is possible for him to inspire himself are necessary to enable him to stand the strain of the season's operations, and at the same time do better work, do more of it, and, therefore, get better results year by year.

The effects of paying a little more attention to the selection of seed, being a little more

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the cost of cultivation and all other expenses, seed included, at the end of the year. The long rotation is the rotation that impoverishes the farm and the farmer; the short rotation, with good cultivation, is the system that enriches the farm and makes happy the farmer.

As indicated above, I am not a faddist on seed, but I must admit that certain precautions are necessary, and that certain points should be observed in the selection of the seed for certain crops. For instance, we have always found it advantageous to buy our corn on the cob, and to test it before buying. We have never had a failure in our corn crop, due in some measure, at least, to the quality of seed employed. Undoubtedly, the best plan is to buy on the cob and shell at home. where any apparently unsound or immature ears can be elimated in the shelling process. Further, we have found it advantageous to sow a sufficiency of seed when planting corn. It may cost a dollar or so more for seed in the year, but it certainly saves each year many dollars' worth of silage at the harvest time.

It is also, we find, very important to secure good root and clover seeds, and to sow a sufficiency of the same. Light seeding of roots and clovers, as well as grasses, are unsatisfactory. The using of poor seed of clovers and grasses is The extra cost is, no doubt, the deruinous. terring influence to heavy seeding and the use of the best of seed. Were it possible for the farmer to see and compare the results from the different kinds of seeds and the different amounts of seed, he would appreciate and never forget the truth that I have just stated, that a large supply of first class seed is the secret of success in growing forage crops. When sowing corn in rows, we usually sow considerably over half a bushel per acre. When planting in hills, about 20 pounds of dent and 18 pounds of flint will be found to be sufficient. In sowing turnips, we use from four