

The object of cleaning is thus effectively secured, and the land is also brought into the best possible condition for sowing winter wheat upon it. The labor of caring for a bare fallow after this fashion is much less than when the land is ploughed three or four times, as is usually the case.

It is argued by some that better crops are secured after the bare fallow, and this compensates for the extra labor. That better crops are sometimes realized is certainly true, but this arises from the fact that usually a liberal application of manure is put upon the bare fallow. Summer-fallowing in itself adds little or nothing to the land. It does not add anything unless it can be proved that it facilitates the fixation of free nitrogen. On the other hand it takes something away in some seasons. In time of heavy rain there is surface washing, or where this does not occur through the porosity of the subsoil, there is washing of nitrates through excessive filtration owing to the absence of outlets to feed upon these, and thus resist their escape. There can be no doubt, however, but that the bare fallow through weathering does tend to unlock inert matters in the soil and render them available, but this is equally true, or nearly so, in growing corn, roots, and rape. This unlocking of inert food, however, adds nothing, of course, to the fertility of the soil. On the other hand the crops above named, although they draw upon the fertility of the soil, they also give back much to its surface fertility by the stores deposited in the decay of rootlets. In the case of rape which is fed upon the soil, more is given back to it than is fed upon it, and where any of these crops is fed upon the farm, the surface fertility of the farm is increased by the amount of plant food drawn from the air and the subsoil, less the waste that may arise in the handling of the material product resulting from these.

Our conclusions therefore are:

1. That the bare fallow as generally conducted, that is with those on four ploughings, as many rollings, and twice as many harrowings, with the loss of one year's crop, is an unnecessarily expensive process.
2. That it adds nothing to the fertility of the land but, on the other hand, detracts from it.
3. That clearing the land can be done effectively without resorting to it.
4. That it should therefore not be practised unless in cases of emergency, or when other modes of cleaning the land cannot be adopted.

The Hydraulic Ram.

Nature is very lavish in the provision she has made for those who till the soil in several of the provinces of the Dominion. Were our farmers all alive to the wisdom of taking advantage of natural assistants, our country would be even more prosperous and happy than it is. Ours is a land of springs and brooks and streams,—conditions of immense value in a land extensively devoted to stock-growing.

We usually build our dwellings with the out-buildings adjacent on elevated spots, and we do so usually for sanitary considerations, the reasons for which are certainly commendable. But this necessitates the obtaining of water supplies by means of wells or cisterns sunk in such elevations, and which must be laboriously pumped up by hand, or by means of wind-power. The brook may be running in the valley not one hundred yards away with its unfailing supplies; but as things usually are, our flocks and herds are required to go down into the valley and obtain their own supplies. This is no great hardship in summer, but in winter it is different.

Now, the supply of water for all the stock, and also for house use may be brought just where it is wanted, if a fall of a few feet can be obtained in the bed of the stream or below the outlet of a spring, by means of what is termed a hydraulic ram. Several of these are now in use but many more might be in operation if their worth were known.

For every foot of fall that is secured in the stream water may be sent to almost any reasonable distance, and to an elevation ten feet higher than the position of the ram. Where there is a fall of ten feet in the bed of the stream, water can therefore be elevated to the height of one hundred feet, and it may be sent across one or more farms where this is desired. When the water is thus elevated, the outflow or discharge will be uniform and continuous as long as the ram itself lasts, which may be for nearly a generation.

Where the discharge takes place, which is usually in a tank or trough about the out-buildings, the overflow of the water may be conducted by means of pipes, or otherwise, to fields on any lower level, as may be desired.

The first cost of the ram need not be very much. It will of course be in proportion to its size and to the distance to which the water is to be conveyed. The latter item of expenditure will depend on the size of the pipes used and the difficulty of laying them. Some use pipes as small as $\frac{3}{8}$ of an inch in diameter inside, or perhaps even a less size than this. The cost of the ram itself will vary from, say, \$10 to \$100. If those manufacturing them in Canada would let themselves be heard from, we might inform our readers where these rams can be obtained; but until they do this, their very useful productions will to a large extent be allowed to remain in the workshop.

The principle upon which the hydraulic ram works is that of the force produced by the movement of running water, which it is not our purpose to dwell upon here. Let it suffice to say that, when once in operation, it does its work incessantly throughout the entire year. It thus furnishes an unfailing supply of water regardless of the wind or weather, and without any other outlay than that of the first cost.

First Principles of Agriculture.

THE NEW AGRICULTURAL TEXT-BOOK.

This concise, practical, and comprehensive work, will, we venture to say, mark an important era in the history of agricultural education in Canada. The authors, President Mills and Professor Shaw of the Ontario Agricultural College, in clear language and in pleasing style, cover the whole vast subject of agriculture and live stock husbandry in such a way that all may harken to and profit by the many messages they have for their readers. The book from cover to cover is full of earnest and impressive teaching, and the reader in assimilating the thoughts of the writers cannot but feel that the authors were determined to do the wide subject they had before them full and complete justice, and at the same time treat of it as concisely, practically, and clearly as the scope of the work would permit.

In harmony with the self-evident views of the authors as to the nature and scope of the work, the publishers, The J. E. Bryant Co. (Limited), have issued the book in serviceable form, beautifully illustrated and printed, and at a price that is well within the purchasing power of anyone. The work, from every point of view, is one of great credit to both authors and publishers, and we feel sure that it supplies a want that has long existed in rural communities.

In our next number we shall thoroughly review the contents of the work. For the present, with the kind permission of the publishers, we extract from the book a chapter on Dairying which our readers will find to be of special merit.

A Pleasant Visit.

During the second week of October, the Ontario Agricultural College was visited and inspected by a party of prominent American gentlemen from Wisconsin, including Prof. W. A. Henry, Director of Wisconsin Agricultural Experiment Station, Mr. Charles R. Beach, a leading dairyman of that state and a member of the Board of Regents of Wisconsin University, and Mr. John M. True, also a member of the University Board of Regents, and an extensive breeder and importer of Percheron horses. The visitors, after a thorough inspection of the College, farm, and live stock, expressed themselves as being impressed with the excellent equipment of the College and the high and clean state of cultivation of the farm. They were particularly pleased to observe that the institution as a whole was enthusiastically devoted to agriculture and stock husbandry; these being honored above all others and not, as in many American colleges, made minor departments. The herds and flocks were complimented freely. It certainly adds greatly to the credit of the authorities of the college to receive such eulogiums from gentlemen closely connected with the agriculture of such a progressive state as that of Wisconsin. The party, further added to by President Mills, Prof. Shaw, and the Editor, visited a few of the stock farms in the immediate vicinity. Mr. Henry Arkell's well-known flock of Oxfords were much admired for their uniformity and scale. The drafted ewes in particular reflected their shepherd's skill, as they were a surprisingly even collection of typical Oxfords, with the weight, form, and quality which that implies. The stock ram at present being used by Mr. Arkell is remarkably smooth and snug in form, with a fleece of first-class quality. A hurried inspection was also given to the Woodland stud, of which Messrs. D. and O. Sorby are the proprietors. Bold Boy, Craigievar, and other crack members of this stud, not omitting the time and premium honored Boydston Boy, were passed in review and were all subjects of flattering comment. The Shropshire flock of Mr. Phin, of Hespeler, completed the series of inspections. This flock is a strong one, not only in breeding ewes, but especially so in lambs and shearlings. Owing to the fact that Mr. Phin is forced on account of illhealth to restrict his farming operations, a sale is to be held this coming winter, to lessen the numbers of this excellent flock.

Comments on Canadian Methods.

To see ourselves as others see us is always interesting, and usually acts as an incentive to future improvement. Professor W. R. Lazenby, of Ohio University, in his sojourn in Canada, as Secretary of the American Association for the Advancement of Science, made good use of his note book, and has lately given the results of his observations to the *Country Gentleman* in an interesting article on "A Trip across Canada." We take from the article, treating principally of the country between Hamilton and Toronto, the following comments which are strikingly accurate for such a cursory examination of our husbandry:

Mixed husbandry seems to be practiced by nearly all the Canadian farmers, and the tendency to specialize is by no means so common as it is in the United States. Wheat and oats appear to be staple grain products. Some corn is cultivated, but as far as I have seen, the crop is a poor one. On many farms no corn is grown. Oats, mangel wurtzels and rutabaga turnips appear to take its place. Barley is quite generally grown, although the acreage is much less than that devoted to oats. The land from Niagara Falls westward to Hamilton is quite level, and appears to be generally well drained and fertile. In fact, the general farm management does not materially differ from that of Western New York. Most of the farm buildings have an old look. The houses are, for the most part, substantial brick structures and have a decidedly home-like appearance. They are usually embowered or belted with stately trees, and this, together with the adjacent fruit garden or orchard, gives an air of comfort and thrift—too often wanting on the farms of our Western States.