

## THE FARMER'S ADVOCATE AND HOME MAGAZINE.

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THE DOMINION.

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### Benefits of Humus and Clover.

From an interesting and valuable address on "Soils and the maintenance of their fertility through the growth of legumes," before the Natural History Society, of Montreal, by Prof. F. T. Shutt, Chemist of the Dom. Exp. Farm, we clip the following extracts as being of special interest to our readers throughout the West, as indeed to farmers everywhere:

Before proceeding to speak of the amounts of plant food in soils, it is desirable that I should call your attention to the importance of humus as a soil constituent, since the method of employing clover as a fertilizer is dependent in a very large degree for its value upon the fact that it adds vast quantities of this material to the soil.

#### THE AGRICULTURAL IMPORTANCE OF HUMUS.

1st. It is the natural storehouse and conservator of nitrogen, which element is the most expensive of all plant foods when it becomes necessary to purchase it in commercial fertilizers.

2nd. It furnishes the food upon which the soil micro-organisms live, and which, by their life functions, convert its organic nitrogen into nitrates.

3rd. It possesses considerable amounts of the mineral food constituents. These, in the further decomposition of the humus—a process continually going on in summer—are liberated in forms available to growing crops. We have reason to believe from recent research that the mineral humates furnish a large proportion of the potash, lime, etc., used by plants.

4th. It is the best source of available phosphorus and readily available nitrogen.

5th. It is the best source of available nitrogen.

6th. It is the best source of available nitrogen.

7th. It is the best source of available nitrogen.

8th. It is the best source of available nitrogen.

9th. It is the best source of available nitrogen.

10th. It is the best source of available nitrogen.

11th. It is the best source of available nitrogen.

12th. It is the best source of available nitrogen.

13th. It is the best source of available nitrogen.

14th. It is the best source of available nitrogen.

15th. It is the best source of available nitrogen.

been noticed that the amount of humus present gives an excellent, though not an infallible, indication of the amount of organic nitrogen the soil possesses. Further, it has been observed that as the humus disappears the nitrogen goes with it. Cultivation—that is, exposing the substance of the soil to the air, as by our ordinary farm methods with the plow, harrow, etc.—tends to dissipate the humus, and, as a natural consequence, to decrease the nitrogen. Soils growing grain exclusively year after year, lose, it is stated, more nitrogen by this humus oxidation than is removed in the crop, and this loss is greatest in those soils which are richest in nitrogen. At the Minnesota Experiment Station it was determined that for every 25 pounds of nitrogen absorbed by the crop (grain following grain for a number of years) 110 pounds of nitrogen were lost due to oxidation of organic matter.

#### GRAIN AFTER CLOVER.

In 1897, eight plots were sown with grain, four with the addition of clover seed at the rate of 10 pounds to the acre, four without the addition of clover. In October of the same year the crop of clover was turned under, the adjoining "no clover" plots being plowed at the same time. The grain sown on these plots were: Preston wheat, Banner oats, Bolton barley and Odessa Barley. This land, without any application of manure, was sown in 1888 with Banner oats. Regarding the appearance of the growing crops on these plots, Dr. Saunders speaks as follows: "The difference in the growth of the grain on these plots was soon very noticeable, and as the season advanced, especially just before the heads appeared, the difference in height and vigor of growth in favor of the plots where the clover had been grown was very remarkable. So clearly was this manifest, that the difference would be distinctly seen at a considerable distance, and the outline of those plots on which no clover had been sown could be readily traced by the manifestly shorter and less vigorous growth. After the grain was fully headed, the difference in appearance was not so clearly seen at a distance, but by careful examination it could be easily traced. The plots were cut and threshed separately, and weighings made of the grain and straw from each plot obtained. The results show an average increase in the yield of grain from the four clover plots of more than 11 bushels per acre over that on the plots on which there had been no clover sown.

To ascertain what natural value there might be from the clover the second year after plowing under, these same plots, without the addition of any manure or fertilizer, were sown in 1899 with Menusury barley. Again a great difference on the plots that had grown clover in 1897 was noticed, and the harvested result showed the average yield on the four clover plots over that of the four "no clover" plots amounted to almost nine bushels per acre.

Another experiment in which equally striking and important results were obtained may be described as follows:—In 1897 two plots adjoining each other and uniform as regards size and character of soil were selected: No. 1 was sown with barley and a grass mixture containing clover seed; No. 2 was similarly sown, with the exception that there was no clover seed in the grass mixture. In 1898 two crops of hay were taken off each plot. In the spring of 1899 they were plowed and sown with Bavarian oats. The yield per acre on No. 1 was 46 bushels 1 lbs.; that on No. 2, 36 bushels 6 lbs.; an increase of 9 bushels 22 lbs. of grain to the acre on the plot which had grown clover over that on the plot sown with grass seed only. This increase was practically due to the fertilizing constituents set free by the decay of the clover roots only, for in 1898 two crops of hay had been taken off.

### To Encourage Good Breeding.

To the Editor FARMER'S ADVOCATE:

SIR, Lately there has been much discussion in the columns of the FARMER'S ADVOCATE as to the free distribution of pure-bred sires by the C. P. R. Co. Now, as this is an old matter, and practically out of date, there is hardly any use of my reopening the question. At the same time, I would like to pass an opinion, not as to the feasibility of their plan to improve the stock of the country, but as to the practicability of their plan for getting rid of the scrub stock and the breeder of them.

I am rather of the opinion that the C. P. R. would have been doing a great deal more in the interest of the stock farmers and cattlemen had they instituted a tariff discriminating against the exportation of scrub-bred cattle. The district in which I live is one of the noted stock-raising districts of Manitoba. Several of the farmers here have gone to some expense in importing pure-bred sires from Ontario, and by culling out inferior stock and breeding only the best of their herds, have hoped to raise such a class of cattle as would, when put on the market as beef, fetch more remunerative prices than that paid for poorly bred cattle. But so far buyers have not discriminated, and to-day farmers who have not endeavored to improve their herds systematically are competing exactly the same price for their inferior stock as those who have gone to the trouble of raising a superior class of herds.

It is, therefore, to be regretted that the C. P. R. should expect to improve the stock of the country by asking them to sell their inferior stock at the same price as the improved stock.

The only way in which the C. P. R. could be expected to improve the stock of the country is by adhering to the principle of discriminating against the sale of inferior stock, so long as

the buyer pays the same price for any class of cattle that comes along, there is certainly no inducement for the farmer who is interested in good cattle to invest his money in pure-bred sires.

The scrub-raiser must be forced to improve his stock, and the only way to get at him is to discriminate against him in price, so that he has either to improve his cattle or have them left on his hands.

JAMES MITCHELL.

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### The Best Bacon Hog.

J. H. Grisdale, Agriculturist of the Experimental Farm, Ottawa, in giving evidence before the Agricultural Committee of the House of Commons during the late session, in referring to the best breed of hogs for bacon purposes, stated that while experiments had not been conducted at the Experimental Farm to satisfactorily settle the question as to which were the best breeds and crosses to produce long-side bacon, his personal opinion was that the Yorkshires and Tamworths and their crosses, and the new Improved Berkshires (not the short Berkshires, of which there are too many in the country), are the best for this purpose.

The Berkshire, he considered, must be carefully fed, on account of the tendency which this breed has to rise on the shoulder, which spoils the long side. He had had good results with Berkshire and Yorkshire crosses. Berkshire and Tamworth crosses had not given good results. He considered the Tamworth and Yorkshire as the best cross.

### Does the Bare Fallow Impoverish the Soil.

Frequently one sees statements to the effect that the soil loses largely of plant food as a result of the bare fallow, and the system of summer-fallowing condemned on that account. Mr. Wm. Vicar, secretary of the Farmers' Institute, Portage la Prairie, recently sent an article by a Mr. Gould, of Ohio, along these lines, to Prof. Shutt, asking for his opinion. Following is his reply, which will be read with general interest:

The facts contained in the article you refer to by Mr. Gould, of Ohio, are in the main correct, though their interpretation for any soil or locality must not be undertaken without due consideration of climatic and other conditions.

The losses spoken of refer chiefly to nitrogen and humus; the mineral elements of plant food—potash, phosphoric acid and lime—would remain the same practically, as regards quantity, whether the soil were bare or not, excepting those amounts, of course, which would be withdrawn by the crop were there one growing.

Soil nitrogen must be converted into nitrates before it is assimilated by farm crops in general. The process of nitrification proceeds during the summer months, and the amount of nitrogen so converted into nitrates would to a considerable extent depend upon the conditions of moisture, temperature and character of soil. Now, the nitrates are exceedingly soluble compounds, and consequently may be largely washed below the reach of the roots of the succeeding crops or entirely leached away if there is no growing crop to appropriate them, and heavy fall and winter rains prevail. It is for this reason that "catch crops" are sown in the autumn in England, and might also be employed in many parts of the eastern provinces of Canada. Although it has been stated by a prominent agriculturist in England that the soils of our Northwest lose their nitrates considerably from this cause, I very much doubt the correctness of the statement, owing to the dryness of your winters. On this point we are now conducting a series of experiments, but it will probably be a year or two before we are in a position to speak definitely.

Of course, like any other operation, fallowing has its disadvantages as well as its advantages, and it is quite questionable whether under a good system of rotation and better manuring it will be as necessary for eastern farmers in the future as it has been in the past. In Manitoba and the Northwest Territories, however, one of the chief objects of fallowing appears to be the storing-up of moisture for the crop of the following year. In districts where the rainfall is sparse the question of the conservation of soil moisture becomes one of the greatest importance. I am also of the opinion that fallowing does a good work in promoting nitrification, the resulting nitrates, as I have pointed out, not being lost to any extent during the ensuing winter.

Besides loss of nitrates by leaching, there may be loss of humus and nitrogen by a process akin to that of slow combustion when land is kept bare and continually cultivated. By a system which comprises cropping with grain and fallowing alternately, undoubtedly much of our rich Northwest soil is gradually losing a portion of its humus (the great water-holding constituent of soils) and with it its associated nitrogen. It is most probably due to this fact that decrease in productivity is now being noticed on these prairie soils where they have been long in cultivation. The above considerations, therefore, point not to the discontinuance of fallowing, but rather to the adoption of the practice of occasionally seeding down, so that the soil's store of humus (semi-decayed vegetable matter) may be replenished and preserved.

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