

## Essays and Lectures.

This column will be devoted to the publication of Essays, Lectures and Papers given on various subjects in our Grange.

### AGRICULTURAL CHEMISTRY AND THE APPLICATION OF ARTIFICIAL MANURES

(Reported for the Grange)

Dr. Henson, of No. 20 Grange, Hydo Park, delivered an able address on this subject recently. In introducing the lecture he said the Patrons of Husbandry considered the disseminating of agricultural knowledge and the improvement of the mind their main object. This lodge had taken the initiative in trying to establish a regular series of lectures on subjects directly connected with agriculture, and he had been chosen to make a start. The range of subjects which presented themselves for consideration extended over the whole domain of the natural science. The knowledge requisite for a successful farmer had always been undervalued, nearly everybody thought he could farm without any particular knowledge of chemistry, botany and the kindred sciences.

His remarks were about the constituents or elements of vegetation. The principal parts of all soils were alumina (clay), silica (sand), and calcareous or limey, and as one or the other of these predominated, they were called clay soil, clay loam, sandy loam, sand, &c. Besides, there were other elements, such as salts and acids, in all amounting to 11 inorganic parts of which the food of plants and the soil was composed, and these were absolutely necessary for the growth of plants.

The lecturer here showed how to detect the presence of these in the soil. In a hundred parts of dried soil the proportion of sand and clay might be easily obtained by shaking the contents in a bottle, when the sand or silica would settle to the bottom, and the clayey portion be dissolved in the water. The presence of lime might be detected by muriatic acid. A soil that contained 90 per cent. of silica, was called a sandy soil; from 60 to 90, sandy loam, from 30 to 60, loamy soil; clay loam 15 to 30; tile clay, five per cent; pure clay none. Besides the support supplied by the 11 inorganic elements mentioned, it should not be forgotten that about 90 per cent. was received from the atmosphere in the shape of carbon, oxygen, nitrogen and hydrogen. Plants had to be fed like animals, but there was this difference, one had locomotive powers and the other had not, one could go from place to place and get the food necessary for its support, whilst the plant was stationary and its supply had to be brought to it. Of course, different plants and soils required various supplies and proportions of plant food, contained in the 11 inorganic elements.

In an able analysis, the lecturer showed that white and red clover, Lucerne and Sainfoin, were more exhaustive of the different salts than anything else, they stood the highest, ranging respectively 74, 91, 95 and 60 in 1,000 parts. Lucerne drew on the land by requiring so much support for its roots. It might not be generally known, but it was the case, that for every 100 lbs. of hay cut it required 400 lbs. of roots to support it. The quantities of organic and inorganic matter contained in any plant may be easily ascertained by simply burning wood or plants; only from 1 to 12 per cent. of ashes is found after burning wood and plants, the other elements, as was said before, being made up from the atmosphere of gases.

Beech supplied the greatest amount of ashes, and this compared with the bulk, was very small. This brought him to an important part of his address—the best way of supplying these wasted elements. Ashes were to him a mine of wealth as a fertilizer, containing magnesia, phosphate of lime, silica, and all the other inorganic elements. He was sorry to say ashes were allowed to lay around farms and put to no other use than selling for a small consideration to soap peddlers. Lime as a manure acted chemically by forming a flux with silica and potash. These two might live neighbors together for a long time and be of no use; but lime united them and formed silicate of potash, which entered largely into the composition of straw, producing stiffness and strength. Lime had the effect of making clay soil lighter and sandy soil heavier. It was like the wand of Midas, which converted everything into gold, it was the key to the strong box of the farmer, which he could open at any time. It had been said of lime that it enriched the father and impoverished the son. The reason of this was plain—it produced so much extra crop that you had to supply a corresponding quantity of manure to keep up the strength of the land; 50 to 120 bushels per acre was recommended.

Gypsum was mainly beneficial in producing moisture and acting chemically on the soil. He had heard a very erroneous idea amongst farmers that Paris plaster, or gypsum, exhausted the soil and produced injurious effects, where the real trouble was they had not supplied the land with other food necessary for its support, such as barn-yard manure and bones. These supply an important element to the soil, being mainly composed of phosphate and carbonate of lime. This principle was taken from the land in the shape of bones, wool, hair, milk, &c. Pasturing (especially with young animals) land to enrich it was indeed a poor expedient, as the wool, bones, &c. taken away was more than was returned. Liebig had demonstrated that this was the reason guano had proved so beneficial in the old lands of England and Germany, and he was confident, unless some better system of farming was adopted in Canada, we should have to resort to a more general application here of artificial manures.

Salt did not enter very largely into the composition of plants; its main use was to attract

moisture and destroy certain obnoxious worms and insects. Guano was formed from the excrement, decayed flesh and eggs of birds, it was largely composed of phosphate of lime and ammonia. As a top-dresser for roots it had no equal. Its chemical effect on the plant was powerful. Two hundred to four hundred pounds per acre was sufficient. Barnyard manure was next referred to, and the question answered which was the best form to apply it in the long or short state, or, rather, in the fermented or unfermented state? In crops that had to be hoed, such as turnips, potatoes, &c., long manure was preferable, as the seed of any noxious weeds which might be retained could be eradicated by hoeing; besides, certain gases were generated in fermentation highly beneficial to the soil. The action of fermentation destroyed the vegetating power of seeds, and thus it would be seen that short or fermented manure was preferable in grain crops where the weeds could not be easily destroyed. The value of manure varied considerably with the animal that produced it. Horse manure was much richer than that of cows, because horses were generally fed better than cattle. Besides, ruminant animals extracted more nutriment from plants than those who did not chew their cud. Poudrette again was much more valuable than any other manure. The relative values were: cow manure, 7; horse, 10; human, 14. Roots made a poor manure, being composed principally of water. Hay and straw were a little better, but the manure that farmers really benefited from was by feeding more grain than Canadian farmers generally did. There was another fact about the application of manure he would like to impress on their minds—that was the use of urine as a manure. In one year the quantity of urine passed by a cow was equal to 900 lbs. of solid matter, and its value as a fertilizer was as 7 to 6 compared with solid manure. This was sufficient to manure 1½ acres.

In speaking of summer fallowing he contended that farmers sadly over-rated its benefits. True, it might destroy the noxious weeds, and disintegrate the sub-soil by exposure to the atmosphere; but it added nothing to the wealth of the land. The lecturer gave the analysis of a soil in Belgium that had been cultivated for 150 years without being fallowed or manured, and raising excellent crops. Draining accomplished two objects—taking away surplus water aerating the soil. The land imbibed much moisture and this retarded the current of air which should permeate the soil and supply the root of the plant with food. The lecturer urged the necessity of draining more by our farmers. The Dr. concluded an exhaustive address by saying the main object he had in appearing before them tonight, was to stimulate others who belonged to the Grange to give addresses or essays on some subject connected with agriculture. No class had more time for mental improvement than farmers' boys. In winter times especially, the farmers had a great amount of leisure time at their disposal. Libraries and newspapers were of easy access, and could be had for a very small cost. There was no reason why farmers' boys should not be the most intelligent class in the community. As far as their physical condition was concerned, it could be said of them *sani mens in sano corpore*. They had every requisite in their daily avocations to make a sound body. Young farmers were apt to envy clerks, etc. but he could assure them their's was a happier lot. The repose of body and mind so necessary to the enjoyment of life, was a blessing enjoyed by no other in so high a degree as by the farmer. While he was sleeping soundly in his bed, depending on the giver of all good for his support, the merchant was toiling hard at his desk, trying how to make his next payment. Let every farmer read more, and devote more of their spare time to mental improvement. They had ten times more capital than any other class, and, by intelligence and unity, they could rule the country. He invited all present to join the Patrons of Husbandry, as it was a true friend to the farmer.

A cordial vote of thanks was tendered the lecturer at the close.

### BUSINESS RELATIONS.

BY WORTHY MANAGER A. R. SMEDLEY.

While much in the direction of a more complete organization remains to be done, yet we may take it for granted that sufficient advancement has been made to warrant a united effort for the purpose of perfecting the business arrangements already so well begun. To insure that success which alone will satisfy, certain conditions are requisite which we will now proceed to consider—

Commencing at the base, the first is, *unity of action and confidence*. It is evident there must be unity of action on the part of the members of the Order to inaugurate such important reforms as we have under consideration. While a few earnest men can do much, yet, to make these benefits widespread and far reaching, there must be a general effort extending to each county, and to each subordinate grange and its individual members, an effort which shall make the moral strength of the effort potent in its influence and power. The very want of this oneness of purpose among the laboring classes engaged in agricultural pursuits, is the reason why avocations long since inaugurated this most essential reform, while the farmers were engaged in individual effort alone. Each man was paddling his own personal canoe, and it was the old fable of the bundle of sticks, over and over again, singly a child might break them all, together a strong man was powerless to bend. Experience has shown others before us, and us as well, that while a single subordinate, grange can scarcely make a beginning, a county organization can do more, but to reap the most complete all the granges of the state, working together for a common purpose, may bring to their aid an influence which will be irresistible in its power, and which shall, in the general success, bring to each individual member a benefit

commensurate with the united effort. Had only twenty mechanics associated together in M. Godin's manufactory, their wages and income would be much less than with the greater number, while their expenses would be much more. With the lesser number they could neither buy nor sell in the most advantageous markets, because neither purchases nor sales would command the attention of that class of dealers who could give them the best of terms. Hence, one may safely conclude that the measure of success will be in proportion to the widespread union of action.

Confidence in the principles on which co-operation is based, and confidence in the men selected by the Order for conducting their affairs, is a requisite as unity of effort. When officers and agents, after due care, have been selected, the moral strength of the Order should be brought to their aid to strengthen and make effective their efforts. I am fully of the opinion that all public servants should be held to a careful and rigid accountability in the discharge of duty, and that any departure from the highest integrity should be visited with severe moral condemnation, but there is, unquestionably, too great a willingness to criticize public servants, and too often to impute matters entirely foreign to the thought or design of the accused. To make any great and important movement successful, to have it reach the end and aim for which it was instituted, somebody must be trusted. Each family in a school district sends its children to one teacher. Why does not each parent teach his own children? Simply because their families are much better educated, and at much less expense, by adopting the co-operative method, and all joining to hire a teacher for a whole neighborhood. But to make this plan effective, even in the small school district, there must be a certain degree of trust in the teacher employed by the officers, and confidence in the faithfulness and purpose of the school directors. It has always seemed to me that patrons, of all other persons, should grow out of this narrow, carping spirit, this readiness to believe evil rather than good, so prevalent in the world. This should be so, first because their closer fraternal relations naturally produce trust and faith in each other, and, secondly, because the principles taught in the Order tend to a broader faith in our fellow men.

"But have we not a better law? are we not all brethren?" "Let us hold fast the profession of our faith without wavering. Whosoever things are of good report, if there be any virtue and if there be any praise, think on these things."

### THE GRANGE NOT A POLITICAL OR PARTY ORGANIZATION.

In answer to numerous inquiries on this subject, we give the following from the Declaration of Principles—

We emphatically and sincerely assert the oft-repeated truth taught in our organic law, that the Grange is not a political or party organization. No Grange, if true to its obligations, can discuss political or religious questions, nor call political conventions, nor nominate candidates, nor even discuss their merits in its meetings. Yet the principles we teach underlie all true politics, all true statesmanship, and, if properly carried out, will tend to purify the whole political atmosphere of our country. For we seek the greatest good to the greatest number. But we must always bear in mind that no one, by becoming a Grange member, gives up that inalienable right and duty which belongs to every citizen, to take a proper interest in the politics of his country. On the contrary, it is the right of every member to do all in his power, legitimately, to influence for good the action of any political party to which he belongs. It is his duty to do all he can, in his own party, to put down bribery, corruption and trickery, and see that none but competent, faithful and honest men, who will unflinchingly stand by our interests, are nominated for all positions of trust; and to have carried out the principle which always characterizes every Grange member, that THE OFFICE SHALL SEEK THE MAN, AND NOT THE MAN THE OFFICE.

We acknowledge the broad principle that difference of opinion is no crime, and in that "Progress towards truth is made by difference of opinion," while "the fault lies in bitterness of controversy."

It is reserved by every Patron, as his right as a freeman, to affiliate with any party that will best carry out his principles.

### CO-OPERATIVE STORES AND FACTORIES.

The success of the co-operative stores of England is due to the fact that they were established in manufacturing countries by a class who have no other means of investing their surplus money. The condition of the English operatives was just suited to the development of this plan, but it will not work out the same results in a farming country, as the farm improvements need all the surplus capital of the farmer. It is the best bank in which to invest his extra funds, this bank never fails, and the thrifty farmer knows it, while he has learned another very important fact, which is, that there is too great an expense attending the transportation of his crude products over a distance of two or more thousand miles, just to have them manufactured. Hence he wants, instead of foreign co-operative stores, home factories. These factories will induce a deserving and industrious population. This population will save the percentage that is now lost, and eventually co-operative stores, established upon our own resources, will spring up. The hue and cry about the English societies is a "catch," a scheme to frustrate our own co-operative institution, the Patrons of Husbandry. The warm reception of the English delegates by the commercial exchanges in all of our large cities is the best evidence of the drift of this wonderful plan. Trade, and not industry, will receive the benefits and pocket the profits.—*Son of the Soil.*

### WE CAN BUY AS CHEAP AS YOU CAN

We find all through the country farmers who still stay out of the Grange. Among the common reasons they give for their course is, that they cannot see that they can gain anything by becoming members, they can buy their supplies just as cheap as the members can, and save the expense of becoming members and the time of attending meetings of the Grange.

Now, let us examine this reason a little. Granting your statement that you can buy as cheap as the members (which is not by any means true in all cases), why is this so? Who brought about this state of things? Why is it that you buy all your implements cheaper today than you could one or two years ago? Why is it that a combination of manufacturers of these implements that had resolved that they would not sell to farmers, only at retail prices, have had to break their own resolves, and are now more than willing to contract to sell us directly at lowest wholesale rates at their factories? Can you answer these questions? We can if you can't. We want you to consider whether the answer reflects any credit to your heads or hearts. The Grange did this. And many that were in the combination frankly acknowledge the truth of this. You are, to a very large extent, enjoying the benefits. But what have you contributed to bring about this profitable result? You can answer that. So can we—nothing. Worse than this. You have encouraged and strengthened those who were trying to break down our agency system by putting prices lower than they could be sold by our agents, even though they lost money by doing so. But they did not expect to have to do this long, for if they could succeed in destroying confidence in our system and breaking down our agents, they could soon make up all their losses by putting prices up again. The contest is not so much between the manufacturers and farmers as between these agents and drummers of the manufacturers, and our system of agency. One or the other of these must fail. If our agents fail then prices go up again. If the drummers fail, prices will go still lower. Which side of this question are you on? You can answer that, but your true answer will be in your acts, not so much, perhaps your words.

This much may be attributed to your sound sense and good judgment, perhaps. Now let us look at the subject from a moral standpoint. You have evaded the burdens and responsibilities of membership, though you profess to have received benefits, you have entertained and encouraged unfriendly suspicions and jealousies towards the best friends of the Order; joined with its adversaries to throw obstacles in the way of its progress by unfriendly criticism, instead of helping forward the great movement. This may be credited, perhaps, to your high ramol sense of propriety.

To own a horse of brute-breaking, get a piece of bed-cord, four times the length of the horse, and double it in the middle, and at the doubled end make a loop, through which pass the animal's tail. Then cross the cord over his back, and pass both ends through the halter ring under his chin and to both ends of the cord to the through ring through which the halter strap plays, the end of the halter being attached to a billet of wood. Should the horse attempt to pull back, the strain will all be on the root of his tail before the halter strap will become tightened, and he will at once step forward to avoid it. After so fixing him a few times in the stable, he will abandon any such propensity.

### A NEW PLAN OF CO-OPERATION.

A correspondent in one of our exchanges suggests the following plan—

Instead of co-operative stores on the Rochdale plan, why not on the regular mercantile, with the fixed and published per cent. over the first cost? Then every one who has the money to pay for what he wants or needs, has the privilege to buy at these stores at the same price as the Patrons, the difference being that the Patrons get back the per cent. in a dividend, while non-members do not. I would have none but a Patron to share in the stock. Is not the Order bound by its symbols and emblems to establish these stores? Can it better carry out the precept of charity to all mankind in any other way? I would ask the question of any fair or square minded Patron, how he can go into a mechanic's shop, and ask him to reduce his price 25 per cent., because the Patron will pay him the cash, and, at the same time, leave him (the mechanic) at the tender mercies of this class of middlemen who are worse on the farmers and their employes than the most ravenous dogs on a flock of sheep.

### WHICH SHALL RULE—NINE TENTHS OR ONE TENTH?

About one-half of our population belong to the farming class. About one quarter of our population belong to the mechanical class. And about fifteen per cent. of our population are laborers who make their living by their muscle. Has any one ever asked himself how much legislation is done by this ninety per cent. of our population? The truth is, the legislation of the country is shaped and controlled by less than one-tenth of the population. It is made in the interest of capital, instead of the interest of the people. And this is the reason there is so much suffering among the industrial classes to-day. There has never been such a concentration of capital going on as within the past few years, and a concentration of capital brings a concentration of political law-making power. Capital has got the people within its coils. Can they release themselves? This is an important question. This must form a great political issue. If one-tenth of the people are to govern nine-tenths, and make them subservient to their peculiar interests, it is time we were awakening to that fact. It can be no harm to bestow a little thought upon this matter.—*Rural World.*