

the manure thrown out into the open square, which soon became one big manure heap. The heavy tropical rains washed through this, and the resulting liquid was carried to the well by the various open drains.

The cattle shed was situated on a hill in the center of the coconut plantations; the coconut trees were all planted in rows from 25 to 30 feet apart. For manuring the trees on the sloping ground in the vicinity of the cattle shed, shallow open drains were scraped out with a hoe between the trees; a temporary wooden gutter led from the well to these drains, and a Coolie pumped the liquid manure from the well into the wooden gutter, from which it flowed into the open drains between the trees. These drains were occasionally blocked with a clod of earth to flood the liquid manure over the roots on each side of the drain.

The liquid manure was carried to the more distant parts of the estate by galvanized-iron pipes, and distributed by means of stand-pipes, which were placed at points where the natural slope of the ground could be best taken advantage of.

This system only entailed the use of two men, thus saving a lot of labor, and reduced the loss of cattle. I have used the same scheme for an orchard and market garden, applying the liquid manure through a hose.

BASIL O. ROBERTS.

New Westminster, B. C.

HINTS ON MACHINERY FOR SPRING.

Editor "The Farmer's Advocate":

As the busy spring season is approaching, a few of these hints may be somewhat out of season, but the bringing to mind of the same will do no harm for future occasions.

The (friendly?) agents of the various companies are trying to secure another harvest for themselves by trying to replace their respective makes of machine for those which are slightly worn, or those which they claim to be of inferior pattern.

Dismiss the agents. Carefully look over your machine, and when you see that it will not render profitable service for another season, go to the different machine shops, consider the merits and demerits of the different makes, and, if possible, get your neighbors' opinions on those they have tried. In this way you can purchase to better advantage, even though it is after the season, or one may be picked up at an auction sale at an easy "bid."

Sometimes agents make out that they cannot secure the parts asked for, so that they can have a chance to sell one of their machines. In such a case, write to the company and ask. If this fails, try to secure one off an old one that is out of use, or replace it, if possible, with one made of good tough hardwood, if space and the call for strain will permit, as the wearing qualities will be almost equal, and the cost a comparative trifle (the writer had a casting replaced on his binder six or seven years ago by a piece of maple, which has given good satisfaction, and is yet quite good).

If bolts are missing, or their place taken by wire, etc., get them; they are cheaper than new outfits. Put them in, and see that they and all others are tight, and kept tight. Some may be difficult to tighten if rusted; put on some oil or coal oil above and below the nut. Then, too, the head may be a round, and also the shank; square the head off by hammering on a flat, hard surface, or cold-chisel the sides off to afford a purchase for a wrench, while you turn the nut with the other.

All woodwork can be replaced at a modest cost, particularly if the farmer is in any way handy with tools. All that he requires is a cross-cut and rip saw, a square, rule, hammer, plane, a brace and a set of bits, a chisel or two and a pencil. Such pieces as shafts, tongues, plow handles, rake beams, etc., may be made at any planing factory or such place. Insist on having wood that is clear, straight and tough, of some good kind of hardwood, viz., rock elm, oak, white ash—something that will not be likely to warp. Paint well, and bolt in place securely.

When the mouldboards of plows become rusty (due to neglect of coating them with some rust preventive), remove the "rough" with some coarse sandpaper or emery-cloth, and then polish with a finer quality, or bath-brick, and oil well. The first few furrows will not be pushed aside, in place of being properly turned, thus making lighter work for the horses.

The bearings should be carefully watched and kept clean. Open up the oil holes to them, and inject coal oil to free the "dirt," the old oil has become dried up and hard. They have a very short life if not properly cared for, and usually being very well made in the first place, and rarely being well taken care of. Their work is of a character that it is difficult to keep them in good condition, for the dust, etc., is continually working into them. Further, the manufacturers do not supply them with adequate

means to prevent the ingress of such destructive elements. Where oil-cups are provided, take some cotton-waste and fill up the cup with it, and then oil. This prevents much of the grit from gaining entrance to the bearing, besides insuring more moderate lubrication, by preventing all the oil running in rapidly, and can be readily replaced by a clean supply when the occasion demands. Where the capacity for oil is limited, more frequent oiling must be resorted to. Leather can be used to good advantage for protecting oil-cups in exposed places.

Reduce both friction and play as much as possible; they both waste power and hasten the wearing-out of the machine.

Painting is seldom practiced by farmers; many, in fact, seem to think it a waste of both time and material. It not only improves the appearance, but helps greatly to prolong the life of the machine, by resisting the action of the weather and atmosphere. The warm spring days, before cultivation commences, will be as good a time as any to do this. Ready-mixed paints, especially prepared for the purpose, can be secured from any hardware.

Lastly, have a tool-box that you can carry to the field with you, and leave it in a convenient place. One made of half-inch pine, two feet long, and about eight inches square at the end, the ends made of inch material; have a close cover, and a $\frac{1}{2}$ -inch rope or strap attached to the ends, so that it can be carried on the shoulder and under the arm. Never depend on tools supplied with the machine. A good outfit would consist of a monkey-wrench, an alligator-wrench, cold-chisel, screw-driver, punches; a flat, a three-cornered, and a rat-tail or round file, eight-inch ones; a brace and some twist drills will not come amiss— $\frac{1}{4}$ -in., $\frac{1}{2}$ -in., $\frac{3}{4}$ -in., $1\frac{1}{2}$ -in., would be a fair range of sizes needed most (but they are not very frequently called for); wire pincers; some black fence-wire; screw-nails; bolts, nuts strung on a wire, also washers the same way; nails and rivets, all of various sizes. This outfit does not require a very great outlay, and is always convenient, so that you do not have to go to the local blacksmith shop when anything gets out of order; thus, both waste of time and expense are reduced.

The real farmer is ingenious—has to be—and if more would only supply themselves with the above-mentioned outfit, or a few more tools, by way of convenience, he could do a surprisingly large amount of repairing in the field. Try it, and many, very many, other things will suggest themselves when it comes to actual practice.

Huron Co., Ont.

E. V. L.

THE DAIRY.

THE CREAM-GATHERING CREAMERY.

(Address by Prof. H. H. Dean at Western Dairymen's Convention, Woodstock, January, 1908.)

ALLEGORICAL.

It is related of Phaeton, son of Sol, who got leave to drive the Chariot of the Sun for one day, that his father (the sun) admonished him somewhat as follows: "Do not ascend too high, or you will burn the heavenly mansions; do not descend too low, or you will reduce the earth to ashes. Do not drive to the right, or you will meet with the constellation of the Serpent; avoid going too much to the left, or you will fall in with that of the Altar. Keep in the middle." In spite of these directions, Phaeton, by his unskillful driving, upset the chariot, setting heaven and earth on fire, and was hurled by a thunder-bolt from Jupiter into the River Po. Mythology further tells us that from the tears of his sisters amber was created.

While we do not anticipate, on the present occasion, any such calamity as befell the son of Helios, a speaker who appears year after year before this august assembly of the dairymen of Western Ontario is in great danger of upsetting the dairy chariot, or of running into one of the great constellations which hover along the milky way. However, with your permission, Mr. Chairman, I shall try to control the steeds of Fact and Fancy, Achievement and Imagination in such a way that as little damage and as much good as possible shall be accomplished during our half-hour drive in the dairy chariot along the milky way of imagination, but the creamery and cheesery road of hard fact.

Sometimes we are able to obtain a better view of ourselves and of our subject by contrast than in any other way. We shall, therefore, treat of the subject in hand by contrasting the butter and cheese business as a whole; then, in particular, with reference to patrons, makers, factories and products.

CHEESE AN ECONOMICAL FOOD.

Taken as a whole, the cheeseries of the Province seem to have flourished better than have the creameries. This is largely due to the fact that the cheese makers have been able to pay higher prices for

milk than have the creameries. This, too, rests upon a commercial fact, viz., that cheese contains more nutritive material than does butter. In the process of cheesemaking, in addition to the water of milk, which probably has at least a dietetic value, two of the chief compounds of food value in milk, viz., fat and casein, are made into the substance known commercially as cheese. There are also other constituents of milk found in cheese in minor quantities. Cheese may be considered as the chief dairy food of the working man, as it furnishes material for building muscle, as well as material for heat and energy.

BUTTER SOMEWHAT OF A LUXURY.

Butter, on the other hand, is largely a fuel food; i. e., it furnishes material for heat and energy, but does not supply muscle-forming constituents. To a certain extent, butter is a luxury for the workingman. When it becomes too high in price, the economical housewife with limited means tries to get a substitute, such as "oleo" (in some countries), fat meat, gravy, drippings, etc. Because of these facts, the market must always be more limited in large populations for butter than for cheese. The consumer may not understand much about the chemistry of foods, but he or she knows that substitutes for butter are more easily and cheaply obtained than are substitutes for cheese and milk.

BUTTERMAKING AND SOIL FERTILITY.

From a purely commercial viewpoint, it would seem as if the cheese business is likely to be more stable than is the butter trade. On the other hand, we need to consider the effects of these two branches of dairying on soil fertility, which, after all, is the basis of agricultural prosperity. Byron said, "As the soil is, so is the heart of man." On thin, worn-out soils, the butter business is undoubtedly the best form of dairying. Many sections of the Province are carrying on the cheese trade at a great sacrifice of soil fertility. The natural conditions are much more favorable for buttermaking. It would be wise if such districts would confine their efforts entirely to selling cream or butter, and allow the cheese to be produced on the richer clay lands, such as abound in Oxford County. Many farmers on light, thin soils are sacrificing future prosperity for a present gain. How hardly shall they that impoverish the soil dwell in happiness and comfort on the earth or inherit the future kingdom! Conditions of soil and roads, methods of farming, and inclination of the people, ought to be strong factors in deciding whether cheese or butter shall be manufactured in a district. Where the soil is light, and the roads not good, especially where the people are inclined to make a strong feature of other lines of live-stock besides pure dairy stock, the creamery is undoubtedly the best form of dairying to follow. On the other hand, where the soil is rich, the roads fairly good, and the people are inclined to specialize in dairy stock, then the cheese business is likely to be most profitable to the farmers, and to all concerned.

THE FUTURE OF OUR EXPORT DAIRY BUSINESS.

Before leaving this general question, we should like to call attention to the following item in a leading Canadian trade journal of recent date: "With a big decrease of 294,613 boxes of cheese and 193,734 boxes of butter in our exports of this season to date, the question may well be asked if our export trade in dairy products is not on the road to final extinction, similar to the change in the same direction as that which has taken place in the United States in its butter and cheese exports?" After speaking of the fact that it is difficult to account for this decrease in dairy exports, the article concludes: "Surely we cannot afford to dispense with an export trade that has brought the farmers of this country a revenue of \$23,000,000 to \$26,000,000 a year."

The foregoing comments should cause all those connected with the dairy business to stop and consider very carefully what should be done in order to stop this progress to "final extinction." We may well ask ourselves if the farmer, the cheesemaker and the buttermaker are getting their fair share of the profits in the business. Have the workers been having "a square deal"? Has there been an undue share of the profits diverted into illegitimate channels? Why are many of the best cheese and butter makers leaving the business? What is to become of the business when the making is left largely in the hands of inexperienced men? These are questions which must be answered, and conditions which must be changed, if we are to continue the export dairy trade along profitable lines.

COWS FOR CHEESE OR BUTTER.

Patrons of both must have good cows in order to produce milk or cream profitably. For the creamery, we need cows which will produce from 300 pounds to 500 pounds or more of butter annually. For the cheese factory, we need cows producing from 10,000 to 20,000 pounds milk or