

a little by using a pulley and rope for raising and lowering the sack. The grain should be sown as soon after treating as possible. It is not advisable to bag it up even the night previous to sowing, unless it is thoroughly dry. It is rather difficult to dry this grain in the barn, and the fact that it might be bagged up while still damp is no doubt responsible for some loss through a poor stand due to inferior germination.

With the sprinkling method of treating seed the same material is used and the same principle applies as in the immersion method. Every kernel must come in contact with the formalin in order that any spores adhering thereto may be destroyed. The same strength of solution used in the immersion system has proved effective when sprinkled on the grain. However, it is generally recommended that one pint of formalin to thirty gallons of water be used. Place the grain on a clean floor and then continue sprinkling and shovelling it until every kernel is dampened. One man with a watering-can and another with a shovel facilitates the work, although one man can do it quite easily alone. When the kernels are all moistened the grain should be covered with sacking and left for three or four hours to give the formalin fumes an opportunity to destroy any spores which might have escaped the liquid. At the end of this time spread the grain out thinly to dry, and as in the case of immersion, it will be necessary to shovel or rake it over several times. In practice it works out that one gallon of the solution is enough to treat a little over a bushel of oats or two bushels of wheat. As soon as the grain is dry enough to run freely through the drill it should be sown. If the grain is at all damp or swollen it will not run through the drill as freely as untreated grain, and care should be taken when commencing to sow to see that sufficient grain is being put on per acre. If it is found impossible to sow immediately after treating, there will be less danger of the germination being injured if the grain is left spread out on the floor than if put in bags. After treating the seed do not allow it to be reinfected by coming in contact with smutty bags, bins, floors or drills. Mechanical smut killers are on the market and they are so arranged that a fine spray of formalin solution comes in contact with the grain as it passes over a cone. The grain does not take up as much moisture as when treated by the two methods

previously outlined and it can usually be sown at once.

One of our correspondents gives the following preventive which he and a number of others have found to be effective. A solution is made by putting five tablespoonfuls of formalin in two gallons of water. This is in the proportion of about two and one-half ounces of formalin to two gallons, and is sufficient to treat fifteen bushels of seed. He states: "In practice I put about fifteen bushels of seed grain in a heap on the granary floor and sprinkle on it the two gallons of formalin solution already mentioned, shovelling it over during the process. I then shovel it over about twice so as to get the whole thoroughly mixed and bag it up at once. It can be sown in an hour's time or a week's time. The amount of liquid used is so small in proportion to the amount of grain that the latter absorbs it in a few minutes, so that the grain scarcely feels damp and runs freely through the drill." When the grain is bagged it holds the fumes more than if spread in a pile. These fumes may have a germicidal action and thus aid in destroying the smut.

From the foregoing it will be seen that there is a vast difference in the strength and amount of solutions which have given results. From two and one-half ounces of formalin in two gallons, to sixteen ounces in thirty or forty gallons or from two gallons of solution to fifteen bushels of grain to one gallon per bushel is a wide variation. It is generally admitted that the use of the larger amount of solution gives less chance for failure in destroying all the spores adhering to the grain. There appears to be no "best" method regarding the strength and amount of formalin solution to use for treating oats and wheat to control smut, various recipes have given results. Immersing the seed in a solution of one pint of formalin to forty gallons of water or using a solution of the strength one to thirty and sprinkling the grain are the methods most generally practised. The latter is favored, principally on account of it being more easily and quickly applied, but both are effective if the work is thoroughly done.

Smut not Controlled by Formalin.

The loose smut of wheat and barley does not yield to the formalin treatment owing to the kernels of grain being infected in a different manner by the disease.

These smuts exact rather a heavy toll each year, and it is regrettable that there is no practical method of controlling them. The spores of the smut are produced as soon as the heads of grain begin to form, and are blown away by the wind. They lodge on the flowers of the plant where they germinate and produce fungous threads which penetrate the developing grain. Thus they are really inside the kernel and no surface method of treatment can attack them. They remain dormant in the seed until it is sown, then they germinate and live as parasites on the growing grain. Care should be taken to secure seed from districts where these smuts are not prevalent. The hot-water system of treatment will destroy the smut spores, but great care must be taken that the temperature of the water is not so high that it will injure the germination of the grain. For a small quantity of seed the following system of treatment might be followed. For treating barley the temperature of the water should be 125 degrees F. and the grain left in it for fifteen minutes. If the temperature is 129 degrees F. five minutes will be the limit of time at which it would be safe to leave the seed in the water. For wheat the temperature is 129 degrees, but it should only be left in the water ten minutes. For either grain 124 degrees F. would be ineffective on the smut organisms and 131 degrees would endanger the germination of the seed. Thus it will be seen that this method of treatment while effective is a delicate one to carry out.

The crop of 1916 was not seriously affected with smut, but there were no doubt sufficient spores scattered around to cause a heavy loss to the oat and wheat crop of 1917 if weather conditions are favorable to the growth of the spores. Why run the risk of having the yield reduced by a disease which can be prevented? The cost of material for treating seed to prevent smut is not high and the method of applying it is simple. Have the formalin on hand so that the oats can be treated just before sowing. Thorough work is necessary. The solution must come in contact with every kernel, and care should be taken not to have damp grain left in bags or heaps for any length of time. Damp grain readily heats and heating weakens the germination which tends to cause a poor stand. The formalin treatment is an effective and practical method of preventing smuts but it is not "fool proof".

Automobiles, Farm Machinery and Farm Motors.

Getting Ready For Spring.

The weatherman has always told us that spring should be dated from the 21st of March, and so, in at least some sections of the country, there must be weather ideally suited to automobile driving, but whether the dust is flying or not, it is certainly time for you to carefully consider steps that must be taken in the preparation of your car for summer use.

If the tires have been taken off, see to it that some talcum is placed around the tubes before they are put in the casing prior to their attachment to the rims. Now you can begin at the engine by oiling the rocker arm ball joints. It is in these that odd sounds may originate because of a drying up process that naturally occurs during the long months of winter. If there are any grease cups on the rocker arm shafts, give every one a half turn to the right, and perhaps it would be well to remove them in every instance and make sure that the supply of grease is replenished. It may never have occurred to you to check over the fan spindle, which if you never do oftener, at least look to this very vital adjunct once before you start your summer operations. Grease and oil may be found to be imperatively necessary. If there is a starter on your car, the grease cup on the sliding gear housing should be twisted over at least a half turn. Also give the grease cups on all the spring shackles, sufficient tightening to force the the lubricant. The king bolts of the steering knuckles must also be greased, as well as the tie rod bearings. It will now be advisable to raise the floor boards and satisfy yourself that the brake pedals are properly lubricated. While

you are at this, do not neglect the clutch release shaft. Moving back towards the end of the car, you will find that the rear springs will be all the better for greasing. It may never have occurred to you as being at all necessary, but at the same time, we can say confidentially, that a drop or two of oil, on the small joints of the spark and throttle, control rods and levers, will never do any harm and may do a tremendous amount of good, if in no other way than by contributing to easy operation and the prevention of rust. This constitutes that number of little things that are essential where a machine has been given maximum care and attention, but if your automobile has been permitted to look after itself, there are additional precautions well worth taking. Might we suggest that you jack up the front axle and unscrew the hub caps. In most cars, your next operation will be the removal of cotter pins and the unscrewing of the spindle nuts. You are now ready to slip off the wheels, when you can easily smear the spindles and ball races with soft cup grease. In replacing the wheels, make certain that you tighten the nuts sufficiently to remove the slightest shake on the spindles. At the same time, there must be enough looseness to allow free spinning.

Cars equipped with a motor generator do not require much lubrication and cleaning, but the oil they do demand must be provided at regular intervals. There is one point that we have mentioned on a number of occasions, but as the spring cleaning is at hand, we are going to impress it upon you once again. Drain all the oil out of the crank case of the motor, the transmission and rear axle, and wash the exposed parts with gasoline or kerosene until they are as clean as new

pins. You can now put in a re-fill of clean oil, feeling positive that the lubricant will give the best possible service. You may not be surprised to hear that oil wears just like any other mineralized substance, and worn out oil is not as good as the lubricant that is full of life and "pep". Furthermore, this dead oil works into the gears and bearings and prevents any new supply from getting to the spots where it can do the most good.

There are four kinds of lubricants that are good for most cars,—motor oil, steam cylinder oil, hard cup grease and soft cup grease or vaseline. We would say that your motor oil should have a flash point of not less than 400 degrees Fahrenheit, and a viscosity from 80 to 90 Tagliabue, or 62 to 72 Saybolt. Perhaps you will not understand this expression, but in any event, the man from whom you purchase the lubricant will know instantly what you require. This motor oil is intended for use in the motor lubricating system, and for such parts as are not otherwise provided with lubrication. Steam cylinder oil serves its best purpose on the motor timing gears, transmission gears, differential, and steering gears. Your hard cup grease should have a melting point of not less than 250 degrees Fahrenheit. It does its best work in the grease cups on the valve rocker arms, as they are subjected to intense heat. A soft grease does not give good results under such circumstances, but can be used around such parts of your mechanism as the fan spindle, spring shackles, king bolts, tie rod bearings, clutch spindle, brake shaft, connecting rod sockets, universal joints, wheel hubs etc. Never use vegetable or animal oils in the motor oiling system, as they contain acids which decompose under great heat and work injuriously upon metal. AUTO.

Canada's Young Farmers and Future Leaders.

Favors a Four-Year Rotation.

EDITOR "THE FARMER'S ADVOCATE":

"A change is as good as a rest", so says the old proverb. This may also be applied to farming in the form of rotation, which should be systematic and I believe a four-year rotation is best for our soil. The class of farming we follow is raising stock and finishing them on the place. Nothing but good grade Shorthorn cows are kept. The soil on our farm is a heavy clay loam, with a close sub-soil and a tendency to sour a little unless well underdrained. The rotation followed is corn and roots on sod, followed by oats and barley, then wheat with clover sown the succeeding spring.

The advantage is that the hoed crop cleans the sod of any weeds, leaving it in clean state for the crop of oats and barley. It is disked as soon as the grain is off, which helps to kill any weeds that may have survived. Then it is plowed shallow and well worked for wheat. The following spring the clover and timothy seed is sown on top and harrowed in, which has a tendency to break up the crust and prevent the moisture escaping.

Another advantage of short rotation is the plowing under of the clover. Then there is the couch grass to contend with. We all know that the longer this is left undisturbed the harder it is to get rid of, especially in the heavier soils.

Lambton Co.

A. D. L.

Would Combine Dairying and Beef Raising.

EDITOR "THE FARMER'S ADVOCATE":

To make farming interesting and profitable the farm should be large enough to use labor-saving machinery to advantage, but not too large to attend to properly. You would thus reduce manual labor to a minimum and make the farm attractive. A loamy soil would be more easily worked and would produce more corn for silo than a heavy soil, providing the land was drained either naturally or artificially. On such a farm of 150 acres, two men could be employed profitably, because there are many things a farmer cannot do alone

to advantage. You could keep from twelve to fourteen cows, one to freshen every month. This number would make it profitable to employ a milking machine and a summer silo. If you did not have a good milking strain of cows, you could buy some good dairy heifer calves at a reasonable price from some successful dairyman. You could then feed them to grow large, heavy milk-producing cows. In order to raise good stockers from these cows you should use a quick-maturing bull of the beef type. A Polled-Angus would be quite suitable. The stockers would be equal to the average dual-purpose class, but their mothers would leave you a larger cream cheque than the average dual-purpose cow. All the calves could be fed well on skim-milk for five or six months. If they were kept until two or two and one-half years of age, you would have plenty of cattle without buying. They could be disposed of at the most profit in June or early July. From twenty to twenty-five hogs could be fed on the remainder of skim-milk, with chop and roots.

You could have eighteen acres of the following crops; the rotation being, first year, corn; second year,