

ful practice. Further than this, when the results of properly incorporating this crop residus in the soil begin to show in future crops, there will be a strong additional incentive to save all the straw and to burn none of it.

There is not a wide margin of profit in the production of grain and various other straw-forming plants and because of this, farmers having that type of crop must be particularly careful to waste nothing in connection with it, and must adopt every means at hand to cheapen the cost of production by getting larger yields for less work. One of the best ways of accomplishing this result is by returning all crop residues to the fields in order to enrich them and to keep them mellow.

Some people think the straw cannot be utilized on the farm. However, there are two methods by which it may be satisfactorily used.

First, on stock farms or on farms having a considerable number of work animals, a large part of the straw may be utilized for feed and for bedding. This is the ideal method of saving straw and returning it to the soil. It serves a useful purpose in the maintenance and comfort of the animals, it absorbs liquid manure and assists in its preservation, and the straw is usually at least partially rotted before it is scattered on the field. In the rotted or semi-rotted condition, it is more readily assimilated, is more easily plowed under and better machinery is available for its distribution; but, there are numerous farms, having little or no live stock to feed around straw stacks in winter or to make use of straw as bedding or feed in barns and it is on such places that the practice of burning the straw or of selling it has become established. Where this condition prevails, the straw should be spread on the land fresh from the stack. In many cases, it may be hauled directly from the stack as soon as threshing is over and scattered by hand methods at from two to four tons per acre. Various types of straw distributors are being offered on the market but on many small farms there is not enough straw to justify the purchase of one of these machines.

The following points should be borne in mind with reference to the application of straw to the soil. Un-

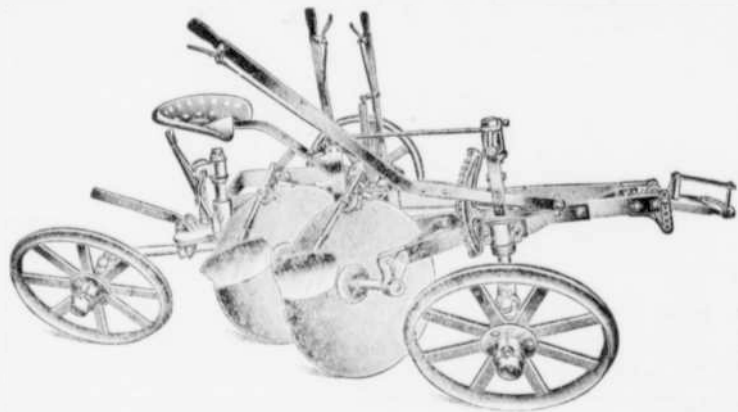
applications are usually better after the first crop has been taken off. The effect of straw on the land is to enrich it to a considerable extent in plant food and on the heavy soils it has a very distinct mellowing effect that makes them easier to work and more productive of crops. It also improves their moisture holding capacity.

Many farmers think that the application of the straw to the soil is too expensive, that it is a difficult operation and that the results are not likely to pay. However, even wheat straw worth \$2.84 per ton for plant food and probably fully as much for organic matter, is valuable enough to distribute, disk in and plow under. Other straws are considerably more valuable and of course can be very well made use of.

One very good method to avoid an excessive amount of distribution and thereby cheapen the operation to a considerable extent, is to cut the grain high and leave a high stubble. In this way, there is not so much straw to put through the threshing machine and the stubble is very uniformly distributed over the soil. The stubble and any additional material that may be added should be gone over with a good, sharp disk harrow and thoroughly worked in. If this is plowed under in the early fall, it may be seeded to fall cereal or vetch and oats or various other fall-sown crops without injury a few weeks after the rainy season sets in.

If the straw is to be applied to lands devoted to spring-sown crops, it is preferable to apply in the fall, disk in and plow under, then finish the preparation of the seed bed and sow the seed in the spring.

The precaution of uniform distribution, thorough disking, good deep plowing and a reasonable interval while the soil is moist, between plowing under and seeding, will give a sufficiently good incorporation of the material into the soil and sufficient time for the most rapid decomposition to take place that any further changes are not at all likely to work any injury. In most cases, they are likely to show some beneficial results but even in case they do not appear the first year, the second and succeeding



Good type of plow for imbedding straw in soil.

der dry-farming conditions, one to two tons per acre is sufficient; under humid conditions, two to four tons, or in some cases, even more, may be applied. In all cases, the straw should be applied as long as possible before the seeding of the succeeding crop in order that there be every opportunity for it to decay so that decay will not be going on at too great an extent during the rapid growing period of the crop. The straw should be applied uniformly, it should be thoroughly disked into the surface soil with a sharp disk harrow and then plowed under to a good depth. This gets the straw mixed with the surface soil so that it is not found in heavy bunches that are likely to cause a burning out of the next crop, but rather, the straw is thoroughly distributed where it can be most efficient in benefiting the soil and there is no excessive drying-out of the surface soil because of the presence of the straw.

Owing to the fact that the straw is rather hard and woody, its decay is a little slow and results from straw

years are almost sure to show better yields.

Some object to applications of straw because of the weed seed contained. In such case, it is always preferable to use the straw with live stock and thoroughly rot the manure before applying it but in case this cannot be done the thrasher may, in many cases, be so adjusted that the bulk of the weed seeds may be kept out of the stack. In case this is not possible, if the straw is shaken out somewhat while being loaded, the weed seeds will remain at the stack and this fine, chaffy residue which contains the seeds may be thoroughly rotted before applying to the soil. In this way, all of the beneficial results are secured without serious introduction of weed pests. With four to four and one-half million dollars worth of straw and stubble in the aggregate or with an acre value for the straw of from one to two or more dollars, we cannot afford to sell it at ordinary prices and under no condition can we afford to burn it.

## PROTECTING KALE FROM CABBAGE GRUB

### Preventives, Repellants and Remedies May All Be Required

#### CULTURAL METHODS HELP

Suggest Protection by Use of Tared Paper Disks Applied on Uninfected Plants.

Oregon kale growers in some parts of the state are more seriously troubled with the ravages of their crops by the cabbage and radish maggots this fall than ever before, and are asking how to control the pest. Effective control begins with cleaning up remnants of the preceding crop and must be followed up by protective and remedial measures as need arises.

"Gather and destroy all waste roots and refuse as soon as the old crop is removed," says Professor A. L. Lovett, assistant entomologist of the Agricultural College. "Plow the land to a depth of four inches or more, and destroy as far as possible all wild mustard and similar weeds about the field.

"Rotate the crops so that plants of the cruciferae family of which the kale is a member, occupy the soil but a single season. The flies are weak fliers and do not usually travel far. The use of quick acting fertilizers and frequent surface cultivation is decidedly beneficial."

Screening the seed beds in which the young plants are started is highly recommended. Infestation often occurs soon after the seedlings push their way through the ground, and even though the eggs then deposited do not hatch before the plants are set in the field they are likely to hatch soon afterward and at once begin feeding on the young stems. The frames are made of 12-inch boards with wires running across the top to keep the cover from sagging, and the tops then covered with coarse cheese cloth, 20 threads to the inch. The frame is taken down a short time before the plants are transplanted to permit them to harden.

In some cases it has been found profitable to pull up the infested plants, remove eggs and maggots by hand picking, and reset.

When the plants are entirely free from the pests they may be protected by putting tared paper disks about them. This keeps the flies that lay the cabbage maggot eggs from depositing the eggs against the stem, or near enough to it for the young grubs to reach it before they starve. Professor Lovett says that the young larvae do not travel far, "considerable less than an inch and a half," before reaching food. Hence if the disks prevent the fly from laying the eggs within a radius of an inch and a half from the stem the young grubs will die.

These disks may be bought from garden supply houses and easily and quickly applied. After that, the growers may feel pretty certain that the plants will be protected until too far advanced for material damage to be inflicted. Success with the disks depends on getting them on plants uninfested either by egg or larvae, and having them fit snugly enough around the stems to prevent the fly from dropping eggs near them.

If it is desired, tared paper, single fold, may be bought and the disks made from it. The paper is cheap, but there is some labor in preparing the disks. Some growers cut them into two or three inch squares—the writer prefers the three-inch size—then cut across the center from one side nearly but not quite to the opposite side, and finish by slitting the center at right angles to the first cut. The writer has found it a great help to drive a heavy spike down through the center before slitting the disk. This action turns down the paper at

the center and forms a flexible flap that fits snugly against the stems.

The disks may be made with a tool recommended by the U. S. Bureau of Entomology. The blade, (fig. A.), is made of a band of steel bent into a half hexagon with an acute angle reaching nearly to the center. A smaller part making a star-shaped cross at the center of the disk, (fig. b) is attached to the handle. One edge of the paper is cut into notches, (fig. c.) and then beginning at the left the disks are cut as in the illustration. The disks are about 2 1/4 inches in diameter. They should be well pressed down around the plant and kept free of dirt on top.

Sulphur applied in the drill row with the seed is recommended by some

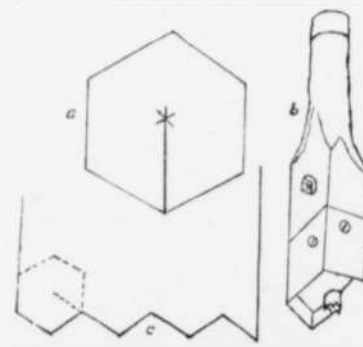


Fig. A—Tared felt card in outline, one-third size; B tool for cutting cards, about one-sixth size; C showing how discs are cut, dotted lines show position of tool. (After Goff.)

growers. Three pints milk of lime and one tablespoonful crude carbolic acid mixed with one gallon of water and sprinkled with a garden sprinkler about the plants, is another preventive of some value. One pint of kerosene to three gallons of sand, mixed and applied near the plants, is a repellent. Powdered tobacco, or white hellebore with ten times quantity of lime, placed about the plants every week, gives good results.

A diluted emulsion of 1 pint crude carbolic acid, 1 pound soap and 1 gallon of water, applied to plants when set in the field, is not only a good preventive but is useful in destroying larvae and eggs already on the plants. The soap is dissolved in the boiling water, and the acid is added only after the soap and water have been portant. The mixture is then agitated briskly until it is perfectly emulsified, taken from the fire. This is im- One part of the mixture is used to fifty parts of water. As much soil is drawn from the plant as can be removed without damage, and about half a pint of the mixture poured down along the stem. The operation must be repeated every eight or ten days while the pest continues active.

#### TWELFTH COW TESTING ASSOCIATION FORMED

Oregon Agricultural College, Corvallis, Sept. 13.—The work of forming cow testing associations is advancing rapidly among the progressive dairymen of Oregon. The twelfth of these associations was formed recently by W. A. Barr, O. A. C. and Federal Dairyman, in Yamhill county.

The Yamhill County association is made up of breeders of pure bred and also grade stock. A large number of breeders are interested in the movement and the association starts off under promising conditions. The results of the associated movement is expected to be the selection and use of better dairy cows and dairy sires for breeding and to detect and eliminate the unprofitable cows from the dairy producing herd.

The officers of the new association are F. E. Lynn, of Perrydale, president; H. W. Jones, of Amity, vice-president; and W. A. Forrest, of McMinnville, secretary-treasurer. Operations will be begun about the middle of the present month.