

how a soil will behave it is important to know how much colloidal material it contains. But a determination of the mere quantity of colloid is not sufficient; the kind of colloid must also be determined, since different soils may contain colloids which are very different in character. Because of differences in the kind of colloidal material present some soils that contain a high percentage of colloid hold less water and plant food and are more friable than other soils containing less colloidal material.

It now seems that if both the quantity and kind of colloidal material in a soil are known it should be possible to predict fairly well how the soil will behave. Although the larger soil grains influence certain soil properties, it is not much exaggeration to say that a soil is known by the colloid it contains.

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## COMBINE Harvesters in the Great Plains

Use of the combine-harvester in the Great Plains has increased very rapidly during the past five years. Only a few machines were being tried in 1918 or 1919, but with improvements in the mechanical features of the small combine the machines rapidly increased in popularity. A great many machines were sold in 1925 and 1926 and in some localities in the area practically all of the 1926 wheat crop was harvested with the combine.

The development of the small, prairie type harvester-thresher has given the farmer of the Great Plains a practical machine which enables him to complete his harvest and threshing rapidly, with a comparatively small amount of labor. A machine having a 15 or 16 foot width of cut, pulled by a 15 horsepower tractor and operated by 2 or 3 men exclusive of grain haulers is capable of harvesting 400 to 600 acres during a reasonably dry season. A machine of this type should cut and thresh 500 acres in 15 days of actual cutting.

A smaller machine having a width of cut of 8 or 10 feet, designed for operation by a single man, is capable of handling 250 to 300 acres in 15 days. With the introduction of the smaller machines the use of combines is increasing on farms with smaller acreages of grain and on farms where the operators hesitate to make the investment necessary for the purchase of a larger combine.

The labor of harvesting and threshing is reduced from approximately 3 man-hours per acre<sup>3</sup> where a binder is used or 2 hours<sup>3</sup> where a header is used to about 0.75 hour per acre with the combine. The reduction in size of crew enables the operator to do a larger proportion of his harvest work with the labor available on the farm. The operator is relieved of much of the expense and dependence on transient labor during harvest.

A properly adjusted combine will compare favorably with a header in saving grain in the field and in short grain will save a larger proportion of grain than will a binder. With short straw, fewer heads are left on the field and the shattering loss is somewhat reduced. The loss of grain in the threshing operation itself should be no greater than in a stationary thresher, and may be expected to vary between 1 and 2 per cent of the grain threshed.

<sup>3</sup> GRIMES, W. E., HODGES, J. A., NICHOLS, R. D., and TAPP, JESSE W. A STUDY OF FARM ORGANIZATION IN CENTRAL KANSAS. Dept. Bul. 1296, illus., 74 pp. 1925.

Where the grain stands in the field for some time after ripening there is some loss from shattering and a greater risk of loss from storm. Most farmers who use combines delay harvest from 6 to 8 days after it would be possible to begin with a binder and from 2 to 4 days after the grain is ripe enough to cut with a header. This delay in starting harvest increases to a certain extent the risk from storm loss while standing. On the other hand, risk of grain losses in the stack or shock is eliminated.

#### **New Problems Created**

Some changes in farm organization and some new problems in grain marketing are likely to result from an extensive use of the combine-harvester in the wheat-producing sections. The reduction in harvesting costs, together with the advantage of operating sufficient acreage to make the best use of the harvesting equipment, should tend to make the wheat acreage per farm approximately the maximum acreage which can be harvested with a single combine. In most sections this would mean a substantial increase in the wheat acreage per farm. The lower production costs should cause wheat to replace more of the competing crops on land which is suitable for the use of the combine.

Some farmers who have a small acreage of wheat find it advisable to own a machine cooperatively with their neighbors. More often, the combine owner with a small wheat acreage completes the harvest season by doing custom cutting for others. In either of these ways, by sharing the investment or by increasing returns from the combine through custom work, farmers with a wheat acreage less than the total capacity of the combine find the machine a profitable investment.

#### **Shortens Harvest Season**

The general use of combines shortens the harvest season in a given locality. Where practically all the grain is threshed three or four weeks after the grain ripens, the problem of marketing or storing is an important one. Few wheat growers have adequate facilities for farm storage and the greater share of the grain is placed on the market as it is threshed. Dry grain in good condition for storage can be readily moved from the local to terminal elevators, but wheat with a high moisture content offers more difficulty. Many farmers are inclined to begin "combining" before the wheat is entirely ripe, particularly if the field ripens unevenly, and the grain is placed on the market with a high moisture content. In rainy or wet seasons, the desire on the part of the farmer to cut his wheat as rapidly as possible results in placing on the market wheat that is too wet for storage. Few local elevators are equipped to dry or handle moist wheat satisfactorily and most of them refuse to accept wheat with a high moisture content.

In some localities the prevalence of weeds in the fields offers some difficulties to combining. Proper adjustment of sieves will remove the common weed seeds, but some weeds, particularly the Russian thistle, give trouble because of the difficulty of separating the moist weed tips from the grain.

The combine-harvester has been used more for harvesting wheat than for other crops but other grains are handled satisfactorily.

The combine is used to a lesser extent for harvesting oats, barley, rye, and grain sorghums. Such crops may present some problems, one of which is the difficulty of saving straw where feed is needed on the farm. A further use is made of the combine in harvesting such seed crops as beans, seed clover, and alfalfa, as they shatter badly from the continued handling necessary to cut and thresh in separate operations.

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## **C**OOPERATIVE Live- stock Commission Agencies Thriving

Farmers in this country have demonstrated that they can market their livestock successfully through their own business organizations. They have set up in the terminal markets cooperative livestock commission agencies, owned and controlled by stockmen. These agencies handled in 1926 over 150,000 carloads of livestock, or nearly 11,000,000 animals, including sales of stock for producers and purchases of stockers and feeders for farmer customers. These two services, selling livestock for producers and purchasing stock for feeders, are the two main functions of the terminal cooperative agencies in this country. The first of these terminal selling agencies was started in 1917. There are 25 of them now in operation, most of which have been organized in the last five years. Their growth since organization has been so rapid that many of them stand first in volume of business in the markets where they are operating.

Approximately 65 per cent of the livestock handled by cooperatives at terminal markets is the business of local cooperative shipping associations. The other 35 per cent is contributed by stockmen who ship individually or in multiple-owner lots, or who truck in their stock to the market. At some terminal markets the cooperative selling agencies handle practically all of the business of the local associations shipping to those markets.

The members of these organizations are producers of livestock. A board of directors is elected by the membership at large. The directors in turn choose a manager who is responsible for the details of operation and for the carrying out of the business policies of the association. Nearly all of the associations are of the nonstock type. They are adequately bonded for the protection of the agencies and shippers doing business with them.

In their actual operations on the market, these associations sell cattle, hogs, and sheep and buy stockers and feeders. Livestock which is consigned to them is received, yarded, fed and watered, sorted and graded if necessary, and sold to the best advantage by salesmen of the association. It is bought by packer buyers, traders, order buyers, butcher buyers, and other operators on the market, and also by livestock producers and feeders. The agencies do not assume ownership of the livestock that is consigned to them. The shipper remains owner until the transaction with the actual purchaser is complete.

### **Methods of Payment**

Collections are made by the commission agency; marketing expense, such as commissions, freight, yardage, feed, and insurance, are