

proved beyond question that at the early stages of seed formation a considerable transfer of material from the straw to the grain may occur after cutting, when the wheat is placed in a condition similar to the shocking and capping of bound sheaves. Prompt shocking and capping, therefore, facilitate the completion of the ripening process. Where it is necessary to cut the wheat quite green, it is important that the sheaves should not be left long on the ground exposed to the hot sun.

The sheaves may be put in long shocks by placing pairs of sheaves in a row, about a dozen bundles to the shock, or preferable in round shocks with caps, twelve to sixteen bundles to the shock, depending upon the size of the bundles, the stage of maturity and the amount of green weeds. In building a shock of twelve bundles, place three pairs in a row, then place two bundles on each side, making ten bundles. Now lay one bundle on the top, then take another bundle, break both ends of the bundle at the band, spreading the ends fan-shape, and lay this crosswise of first bundle. In some cases only one bundle is used, treating it as just indicated, and in other instances the caps are entirely omitted. Usually, however, capping with two bundles is to be preferred. In building a shock of sixteen bundles, place four pairs in a row, then three bundles on each side, and cap with two bundles. Both for efficiency and economy of time, two bundles should be handled at once, and care should be taken to place the bundles firmly on the ground. There is a knack in shocking that may be easily learned by practice, which adds greatly to the ability of the shocks to withstand wind storms.

There are four types of power machines for harvesting wheat and other stored grain at the present time. They are: (1) the self-rake reaper; (2) the self-binding harvester; (3) the header; and (4) combined harvester and thresher. The hand cradle is still manufactured and used for harvesting small areas.

All harvesting machines have certain features in common. These are the serrated sickle vibrating through stationary guards, a platform to receive the cut grain,

some provision to bring the grain regularly against the sickle and deposit it on the platform, a divider to separate the swath to be cut from the remainder of the standing grain, and some means by which the operator can quickly raise or lower the cutter bar while the machine is in motion.

In the self-rake reaper the platform has the form of a quarter of a circle, and upon it operate automatically rakes which serve the double purpose of bringing the grain onto the platform and removing it from the platform

The size of the bundle is therefore determined by regulating the pressure required to trip the binder. Binders are made which cut different widths, the standard width being six feet. Three horses are used with the six-foot cut, and an ordinary day's work is from ten to twenty acres, depending upon many factors, the most important of which are the yield and the condition of the straw.

The header and the combined harvester can be used only where the climate is such as to permit

lines attached. It requires four men to operate this machine; one to drive, one to tilt cutter bar, one to sew filled sacks and dump upon ground from time to time as they accumulate in groups of six or eight and one to have general charge of the machine. Five to seven hundred bushels of wheat may be harvested, threshed and sacked with one of these machines in a day. There are still larger machines, cutting a swath twenty-five or more feet in width and operated by steam power, and doing a correspondingly larger amount of work. This machine is not used in Canada, but is used quite extensively in California, Oregon and Washington.

OATS.

The evidence appears to be that oats may be cut when one-half the leaves are still green and the

grain in the early dough, without materially injuring the chemical composition or the yield of grain, and that the yield and quality of the straw may be increased provided the sheaves are immediately shocked and capped to permit slow curing and ripening. Cutting in the hard dough stage and slow curing in round shocks is generally desirable, but when weeds abound or for other reasons rapid curing is necessary, long shocks are better. Oats may be cut for hay while the grain is in the milk stage with mowing

machine and treated as any other hay crop, or may be cut with self-binding harvester and put in round shocks of six bundles each, with one bundle for a cap. The methods of harvesting, threshing and storing of oats are similar to those of wheat. The Ohio Station found the shrinkage of grain between September and March of

fifty-five varieties to be less than one per cent. and of a sample of baled oat straw during the same period about six per cent. Michigan Station obtained similar results with the grain two years, and a loss of three per cent. another year.

BARLEY

Barley that has been allowed to ripen fully will be likely to have the most mealy endosperm, and most likely to sprout uniformly. On the other hand, if allowed to ripen fully, there is more danger of discoloration from rain and dews, and as this character is counted so important in fixing the commercial grade, early cutting is frequently practiced.



The Massey Harris at Delmar, Min.

far enough to one side so that the reaper can again pass around the field without running over the cut grain. The size of the bundle is determined by regulating the number of rakes which remove the grain. Because of the necessity of binding the grain by hand, they are used only where small quantities are to be harvested. The reaper cuts a swath of five feet and is drawn by two horses. An ordinary day's work is from six to eight acres.

By far the larger area of small grain is now harvested by this

harvesting the wheat after it is fully ripe and thoroughly dry, and hence are in use only in the western half of the United States. Instead of cutting the wheat near the ground, they merely head it, leaving the bulk of the straw standing in the field. The header conveys the headed grain to the side of the machine and elevates it so that it is deposited in a wagon driven along side to receive it. The grain is either immediately carried to a threshing machine or first put in stacks and subsequently threshed.



6 Foot and Wood Binders in one string. Just think of what they can do to a section of grain.

machine, generally called the "binder." They are manufactured in a number of styles, but in their essential features they are nearly all practically identical. It differs from the reaper in having a reel to bring the grain against the cutter bar and deposit it on the platform. This reel is attachable at the will of the operator while the machine is in motion. The cut grain is conveyed on an endless canvas to an elevator consisting of two endless canvases which deposit the grain on the opposite side of the drive wheel, where it is packed into a trim bundle and automatically bound with twine. The binding device operates as often as the pressure of the increasing bundle trips it.

The header cuts a swath twelve and twenty feet wide, and is usually pushed by four horses. An ordinary day's work is fifteen to thirty acres.

The combined harvester and thresher is a combined header and threshing machine. The standard machine of this type cuts a swath eighteen feet wide, the cutter bar being attached directly at the side and forward end of the thresher. The headed grain is conveyed to the thresher, which is made to operate by being pulled over the ground by twenty-eight horses or mules. The animals are hitched in three sets of six, then two sets of four. In front of these are two, and to this pair alone are