Many older seedsmen will remember that the purity of seed coming from the old time threshing operations was such that it was almost good enough to bag and tag without further cleaning.

On the other hand, seeds harvested with modern combines may contain as much as 60 to 70% foreign material -- consisting of trash, weed seeds, stems, leaves and freshly killed insects. Much of this material may be green, making the seeds difficult to handle and dangerous to store until this foreign matter has been removed. Therefore, in many seed cleaning plants today the first machine used is a scalper. The scalper removes the bulk of the foreign material so that the seeds can be mechanically handled and safely stored until the cleaning operation can be finished. Scalper machines may consist of simple reels to remove the long straws, or they may incorporate a flat screen to separate the long straws and the green material. They may also be a combination of top screens or bottom screens necessary to handle the kind of seed coming in. These machines are built with a fan if it is desirable to have an air separation while the seed is being scalped. The scalper with air takes off large foreign material with the top screen and sifts out sand and small weed seeds with the bottom screen.

After most of the foreign material is removed further special processing of the commodity may be required to prepare it for final cleaning. Clipped bluegrass seed may have to go through a beater machine to break the seed free from the plant even before scalping. Other seeds may go to a debearder, which in effect finishes the threshing of the seeds by removing awns, points of attachment, beards and excess chaff and delivers them as individual seeds to the finishing cleaner for accurate cleaning.

The debearder is made up of a horizontal steel drum in which stationary arms are positioned along the inside to prevent the mass of seeds from swirling inside the machine and a central beater shaft with hardened arms extending out into the body of the debearder which turns through the seeds to finish the threshing. One function of the debearder is to break apart grass seed doubles. Another is to remove the awn and outer glume from watergrass seed harvested with sudangrass seed and in the process to break apart clusters of sudangrass seed. When the glumes and awns have been removed by the debearder, the size of the watergrass seed is greatly reduced so that a very easy and quick

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separation can be made with a screen.

Other uses for the debearder are the shelling of unthreshed wheat kernels commonly called whitecaps, the debearding of barley and the removal of barley points of attachment, removing the whiskers from carrot seed and the partial decortication of sugar beet seed. The most common use is for clipping seed oats. When seed oats are clipped by the debearder, those oats that are still wrapped in the outer glumes are detached from the glumes, double oats are separated, awns (if the oats carry awns) are removed, fuzzy tips of chaff on the oats will be clipped, the oats will be polished and their test weight greatly increased. Oats thus processed can be easily elevated and accurately fed through a cleaner hopper. The cleaner in turn can then make a very accurate separation since there will be no doubles or unthreshed glumes riding over the top screen into the screenings. The finished product will not be exceptionally clean but the appearance of the oats will be greatly enhanced. While clipping the oats greatly improves the test weight, the removal of the chaff, awns, and other material hardly affects the actual weight of the product. This trashy material is so light that the loss of weight can hardly be measured.

Some seeds must be hulled with special hulling machinery before they are ready for cleaning; therefore, in many seed plants seed hullers are used before the finishing cleaners.

Many kinds of legume seed carry a percentage of hard seeds making it desirable to scarify (slightly scratch the surface of the seed so that it will absorb water and germinate the first year that it is planted) the seeds either before or after the final cleaning. Some varieties of seeds will be scarified long after they have been thoroughly cleaned, since the scarification may reduce the length of time that the seeds will maintain viability in storage. Scarification in those varieties may be performed shortly before the actual planting time. Other kinds of legume seeds may require both hulling and scarification. The hulling of many kinds of grass seeds in the hulling and/or scarification of legume seeds is generally accomplished with a huller and scarifier machine which in some manner causes the seeds to be abraded by a rough surface to effect the hulling and scarification. The machine our company makes performs its hulling and scarifying by impelling the seeds at controlled velocity against carborundum surfaces within the unit which abrade the coat of seed and either remove the outer coat or scratch the inner coat as is required. This same machine is available with rubber huller surfaces for use in hulling only. It is especially useful in the case of thin skinned legume seeds which have an inner coat that is too thin to resist the abrasion of the carborundum yet which seedsmen desire to hull before planting or finish cleaning.

After the seeds have been properly scalped to remove the excess foreign material harvested with the seed and after they have been clipped, debearded, hulled and if necessary scarified, they are ready for additional processing by means of the cleaning machines normally used by a seed cleaning plant.