

The draft should be applied along a straight line extending from the point of attachment on the horse's collar through the point of attachment at the bridle of the plow to the center of draft on the mold board. If the hitch is made too high or too low this line will not be straight and there will be loss of force.

Dynamometer tests indicate no difference in draft, on level ground, between walking and wheeled plows, the latter carrying a man. The reason for this increased efficiency is that the wheels convert sliding friction into rolling friction. The weight in the riding plow is carried by the wheels instead of by the bottom of the furrow. A wagon of given weight pulls easier over an earth road than a sled of the same weight. In going up hill draft is greater in riding plows because of the extra weight that must be lifted to the height of the rise. The ideal farm hand will walk up hill and ride down.

The adjustment of wheeled plows is different from that of walking plows. With a wheeled plow the bridle or clevis at the end of the beam is set so high that the bottom of the plow touches only at the cutting edge. The friction is thus transferred from the bottom of the furrow to the wheels. If the hitch is too low the tendency is to throw the weight of the machine and rider on the sole of the plow and greatly increase draft. With the walking plow the hitch should be low, so that the heel of the plow will hug the bottom of the furrow, and thus relieve the sole or cutting edge from bearing the greater part of the friction, and also with this arrangement the plow moves steadily, requiring less attention from the plowman.

Three-wheeled plows are coming into favor. By means of these the plow is more perfectly carried and at the same time more firmly held to the work. Also the tongue may be jointed, so as to allow turning at a right angle more easily than can be done with a rigid tongue.

Experimental evidence is not sufficient to justify us in speaking definitely as to the effect of coulter on draft. Experiments by Sandborn indicate that coulters uniformly increase draft, while experiments obtained by Gould and others show different results. However, it seems clear that they lessen draft in sod ground. Coulters of all kinds should be set immediately back of the plow point.

The plow is not a perfect implement. It does not completely pulverize, and often packs the soil. It tends to compact the sub-soil by pressure exerted on the bottom of the furrow. It is a slow process. Notwithstanding imperfections, it is the most perfect implement we have for deep and thorough work.

The draft of the plow is relatively great, but when we consider the amount of dirt moved, the draft is less than any of those pulverizing implements designed to take its place. Professor Sandborn tested this point by preparing a seed bed on a piece of unplowed corn ground on which the stalks and roots had been removed. Comparative trials were made, with the disc harrow, the Acme harrow, the Lubin harrow, the Albion cultivator, the spring tooth harrow and the smoothing harrow. The average draft of these implements in preparing a seed bed was for each inch of dirt moved, 8.77 pounds, while the average draft of the plow under like conditions was 5.24 pounds. The draft of these implements was 3.07 pounds for each inch of soil moved. In other words, the sum of the plowing and pulverizing was not equal to the draft consumed in pulverizing an equal quantity of soil without plowing. This does not mean that it is never cheaper not to plow, for in some cases the seed bed may be prepared cheaper and better by the pulverizers, because the plow moves more dirt than is necessary.

The plow does not usually leave the ground in proper condition to receive the seed. As a rule the plowed surface is too uneven and irregular and is not pulverized. The plow is a poor pulverizer. In some cases it compacts the soil rather than pulverizes it. Plowing a loose, wet soil, it is necessary therefore to follow the plow sooner or later with some kind of pulverizing instrument.

1. The fineness of the soil. May test this by passing soil through sieves of various sizes.

2. The looseness or compactness of the soil. The disc harrow tends to loosen the soil and make it fine, and at the same time compacts it. Wheat needs a compact seed bed. Corn needs a loose seed bed. Hence we may say that for most soils we would use the smoothing harrow in preparing a seed bed for wheat, and the disc harrow in preparing for corn.

3. The amount of draft required to pulverize a given

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