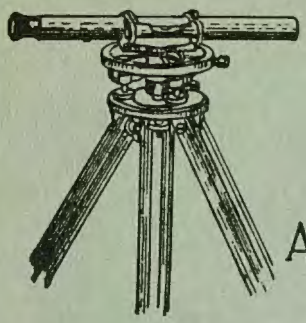

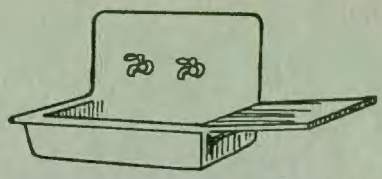

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TRACTOR DRAWBAR CAPACITY

J. B. TORRANCE

Most of our agricultural machines are readily classified as to size. Mowing machines and binders are built to cut swaths of definite widths. Disks and harrows are made in definite sizes. Planters and drills care for a definite number of rows or feet of grain planted. Plows are built to turn furrows of rather definite widths. When horse drawn, we have become acquainted with the number of horses required to operate the various widths of equipment and the amount of work which can be accomplished.

GROUPING TRACTORS ACCORDING TO CAPACITY

The entrance of the tractor into the picture, however, has introduced several new angles into this situation, one of which is the setting up of a more logical and a more easily understood grouping as to size, or ability to do the required work. The tractor as a power unit has certain characteristics which are quite different from horses. Most tractors have more power than one horse, but all tractors of course do not have the same capacity. Consequently, it becomes necessary to classify tractors by putting all of those with approximately the same capacity in a certain definite group. In the past, tractors have been classified into one, two or three plow groups, meaning of course that they might be expected to pull a certain number of plows. This has not proven satisfactory because of the great variety of conditions encountered.

In this connection it is necessary to keep in mind the average resistance to plowing of different soils per square inch of furrow slice as shown in the following table:

Sand	2 to 3 lbs.
Silt loam	3 to 4 lbs.
Light clay	6 lbs.
Medium heavy clay	8 lbs.
Prairie or virgin soil	15 lbs.
Dry land gumbo	20 lbs.

From this table it is easy to see that the force required to pull a 2-bottom 14-inch plow in sand would be entirely inadequate to pull the same size plow in medium heavy clay.

Another method of classification is by indicating the drawbar power of a tractor in terms of the number of horses that would be required to pull certain equipment. This is quite satisfactory in some respects as the average tractor operator is acquainted with the number of horses required for the various operations in his own community. However, when trying to compare the drawbar requirements of different localities, with their varying conditions, this method of classification by drawbar power is not sufficiently exact.

By means of the drawbar dynamometer it is easy to determine the drawbar pull of a tractor in pounds. However, grouping tractors on the basis only of drawbar pull would not be satisfactory. We are interested in the amount of work that can be done in a given time. On the basis of pounds pull alone, a given tractor might be able to pull a larger implement than ordinary but at a much slower speed. Another tractor with less pounds pull but greater speed might accomplish just as much work in the same time. In this connection it may be pointed out that some operators are too much interested in speed, driving in high gear with fewer plows when they could actually accomplish more work at slower speeds by pulling an extra plow bottom, thus saving fuel and resultant cost.

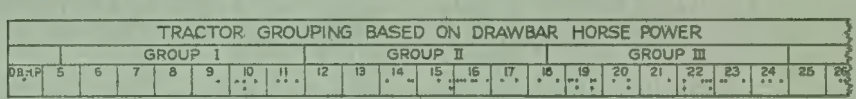
Because of their seasonal characteristics, it is important that certain agricultural operations be completed in a comparatively short time. Economy must not be overlooked. That is, the whole implement layout should be carefully planned, and, if a tractor is to be used, it should be of such size that it will be operating with an optimum load as much of the time as possible. The optimum load will be the heaviest drawbar load consistent with the size of the tractor and the speed at which it can be conveniently and economically operated. Optimum loads are not always conveniently possible but are goals to be kept in mind for economical tractor operation. When we speak of *optimum* loads we do not mean *maximum* loads. Leave the maximum loads for the emergency. When both the drawbar load (pounds pull) and the speed with which the load is moved are considered together, we are arriving at a unit of measurement which may be used as a reliable means of classifying tractors into convenient groups. Such a unit is spoken of as drawbar horse power.

RECOGNIZED BASIS OF CLASSIFICATION

Data for indicating such horsepower possibilities for all of the tractors in general use are available in the published results of the Nebraska Tractor Test. All of the tractors have been tested by the University of Nebraska and have been assigned a rating as a result of this test. This rating, which is known as the highest permissible rating which the manufacturer may use for that tractor, is being used as the basis of a grouping of tractors according to capacity which is proposed here. At the University of Nebraska, the tractor is given a highest permissible rating for both belt work and drawbar work. It is proposed that the classification be made on the basis of the drawbar rating only, because tractors are purchased primarily for drawbar work. They are usually used for a larger number of drawbar operations than for belt work, and the power limit is usually encountered in drawbar work rather than in belt work. The highest permissible drawbar rating assigned by the University of Nebraska represents in general the optimum capacity of that tractor.

DETERMINING GROUPS

The proposed new grouping is illustrated in the accompanying diagram. On this diagram a current model of farm tractor is represented by a circle located according to the highest permissible drawbar rating. We find that many of the tractors are concentrating in groups at various points along the scale. Various groupings would be possible, but in proposing a new grouping of this kind, it seems desirable to have the grouping correspond, to a certain extent at least, with the generally accepted idea of a two-plow tractor, three-plow tractor, etc. It is proposed that the group interval be 6½ drawbar horse power, and that Group No. 1 begin at 5½, and include up to 11.99 horsepower. The next 6½ unit begins with 12, and Groups 3, 4, 5, etc., would continue at the same 6½ unit intervals.



* Drawbar horse power.

While it is true that the concentration of tractors does not occur near the middle of every one of these groups, nevertheless there seems to be a natural deficiency of tractors at and near the borderline of most of the groups. It is felt that a grouping of tractors according to capacity based on the very definite drawbar rating assigned to them by the University of Nebraska as a result of official tests would help to curb that situation and make possible a grouping that would be more definite and more workable than any which has been used in the past.

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