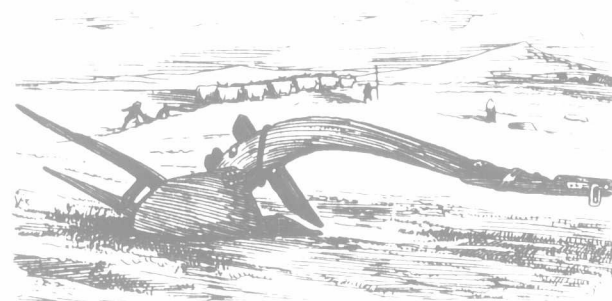


four-inch mat of sod which nature has woven during countless years over the fertile loam of the prairie, are the factors chiefly responsible for the development of the special-purpose engines and plows which have made traction plowing the undoubted success, financially and agriculturally, that it to-day is in very many districts. For the Western "wheat-miner," one furrow at a time—even though that one was fourteen inches wide—was too slow and tedious a way of uncovering the virgin wealth of plant food which invitingly beckoned on every hand, so he conceived the idea of hitching four, six, eight, or even ten, bottoms behind the traction engine that stood idle and resting in his yard from the close of one threshing season to the opening of the next. The plan worked, but not very well. The quality of the work suffered first. An odd plow was not adjusted right, and did poor work; a ragged job was made of the ends of the fields; careless feelings and slovenly finishes resulted. The outfit must be kept going, at all costs, and the operator smothered his disappointment at the failure of steam plowing from an agricultural standpoint, went ahead, and boasted of its success from an economic standpoint. But his joy was turned to mourning. The cast-iron gears with which all traction engines were then fitted soon began to wear and break. The comparatively narrow wheels of the threshing engines often failed to keep the machine on top of the sod in soft places, when the heavy drag of the plows was added to the weight of the engines, and much time was lost in this way. Then the light plows, designed and built to be drawn by three or four horses, failed to withstand the terrific strain which was put upon their frames and share-points, when one of a gang of two or three plows struck a stone or root, and the whole power of the engine was brought to bear on the one bottom. Principles of draught and alignment were not understood very perfectly by these early operators, either, and much trouble and poor work resulted from defects in these places. Thus, early attempts at steam plowing largely failed on the mechanical and economic side, as well as on the agricultural. Naturally, all this brought the idea of steam plowing into general disrepute, and the term was associated in men's minds with weedy farms, careless farming, and broken implements.

Then the manufacturers began to recognize the needs of the Western prairies, and put their designers and experimenters to work evolving a dual-purpose engine and special-purpose plows. Soon the pioneer operators—if they had not damned the whole project in disgust—were provided with an outfit that enabled them to turn the tables upon their critics, and he who laughed last, laughed best and longest. The steam plow which the manufacturers evolved was indeed a different implement from the old traction engine and the light, rigid, brittle plows. High-powered, twin-cylindere, fast-travelling, steel-geared, wide-wheeled, steam-steered monsters, with storage capacity for forty or fifty barrels of water and a ton of coal, drawing heavily-built, simply-adjusted, steam-hoisted, flexible steel plows, composed the first outfits which were offered to the ardent individuals who found breaking with horses too slow and expensive. Soon other makers were in the field, with modifications and new ideas, so that now the large farmer who desires to put 1,000 acres of wild prairie under wheat within a year, has a choice of three distinct types of traction plow, each of which will perform the feat within a few weeks, and require but three or four

men to operate it. All the original defects have been overcome, and the man who has a farm suited in topography and soil to the limitations of traction plows need have no fear but that he can farm well with their aid. During June and July, this year, the recently-acquired land of the new College of Agriculture for Saskatchewan, at Saskatoon, was brought under cultivation by this means. A 40-h.-p. engine drawing ten 14-in. bottoms and packers weighing 3,000 pounds, plowed and rolled 700 acres of this land, at a rate of 50 acres a day, doing an excellent job.

Traction plowing and cultivation has its limitations. Under present conditions, this method cannot be economically or satisfactorily applied on all farms. Fairly level land, practically free from stone, small sloughs or pot-holes, is essential to success. Two factors must always be kept in mind: (1) Will the proposition pay now; i.e., can a given piece of work be done more cheaply by traction power than by horse power? And (2) will it pay in the long run; i.e., will the quality of the work be such as a permanent system of agriculture demands? Unless these two questions can be affirmatively answered, after an intelligent study of the situation, traction plowing had better be left alone. The experience in the West, when summed up, is that, under such conditions as have been outlined, the proposition is generally successful.



The "Twal Owsen Plow."

It was stated that the traction plows in use now were of three types. These are: (1) The steam plow proper, which is attached directly to its own engine, and requires no operator. They are raised at the end of the furrow by the engine admitting steam to the two cylinders carried on the frame of the plow. This plow frame is carried on one wheel, and the wheel is so connected with the front wheels of the engine that, when the latter are turned by the steersman, the former is also affected. Thus, rigs of this type can back up or turn in small places. The second type is best represented in the Cockshutt engine plow, which is the favorite engine plow of the West. This plow can be used with any engine—unlike the steam plows. The plows are all attached to a triangular frame on three or four wheels, and are raised and lowered by long levers. Each plow is an independent unit, and is not attached to its fellows on either side. They are heavily built, well constructed, and give excellent satisfaction under widely-differing conditions. The third type is the engine gang, which is simply an ordinary gang plow, comprising two, three or four bottoms hung in one frame. The engine gang is much more strongly constructed than a horse gang, but it lacks in flexibility when compared with either of the other types. These gangs can, of course, be attached to any make of steam or

gasoline engine in the desired number, proportionate with the power of the engine.

An engineer, fireman, water-hauler and plow-tender compose the usual gang of men required to operate one of these outfits, and their average day's work, taking in large and small engines, good weather and bad, is from fifteen to twenty acres a day. From a ton to a ton and a half of coal will be burned each day by the large engines, or about a barrel of gasoline by the large gasoline outfits. The price and quality of coal varies so greatly that it is hard to arrive at an average cost per day, but the average of twenty or thirty rigs was found to figure out at \$1.52 per acre last summer. Much more sod than stubble is plowed by these rigs at the present time, their great weight and size rendering them of questionable value on stubble, or within a fenced field. This is where there is such an increasing field for the lighter and handier gasoline tractors. Less power is required for the stubble plowing, so that the big steam engines waste much of their power through not having as many plows in their outfit as the engine could haul in stubble plowing. The engines used on this class of work vary in power from 25 to 40 h.-p. in steam, and from 15 to 40 h.-p. in gasoline.

It is doubtful whether steam cultivation is economical, apart from its undoubted advantages as a means of reducing large areas of prairie to a crop-bearing condition, and it is generally expected that the day of the huge steam traction engine will be gone when the prairies are brought under subjection.

The last word has been said in the matter of steam-traction construction, and their size and weight cannot be overcome. These features are inseparable from the production of steam, but they are detrimental when the engines come to be used largely on cultivated land, and for general farm purposes. They have more power than can be economically used on the farm for any other work than breaking prairie and threshing.

Thus, attention is being centered on the gasoline tractor, which is yet in its infancy, and is hardly well into the experimental stage. Certainly, a great field awaits these tractors when they are sufficiently advanced in reliability to become a commercial proposition. The wintering of large numbers of horses in idleness is the cause of much loss on the grain farms of the West, for it seems as though the horses are more liable to sickness and digestive troubles during the slack period than when hard at work. Whether the tractor would appeal to the Eastern farmer, with a smaller farm, on the average, more stock, and perhaps a shorter period of enforced rest from field work, is another question.

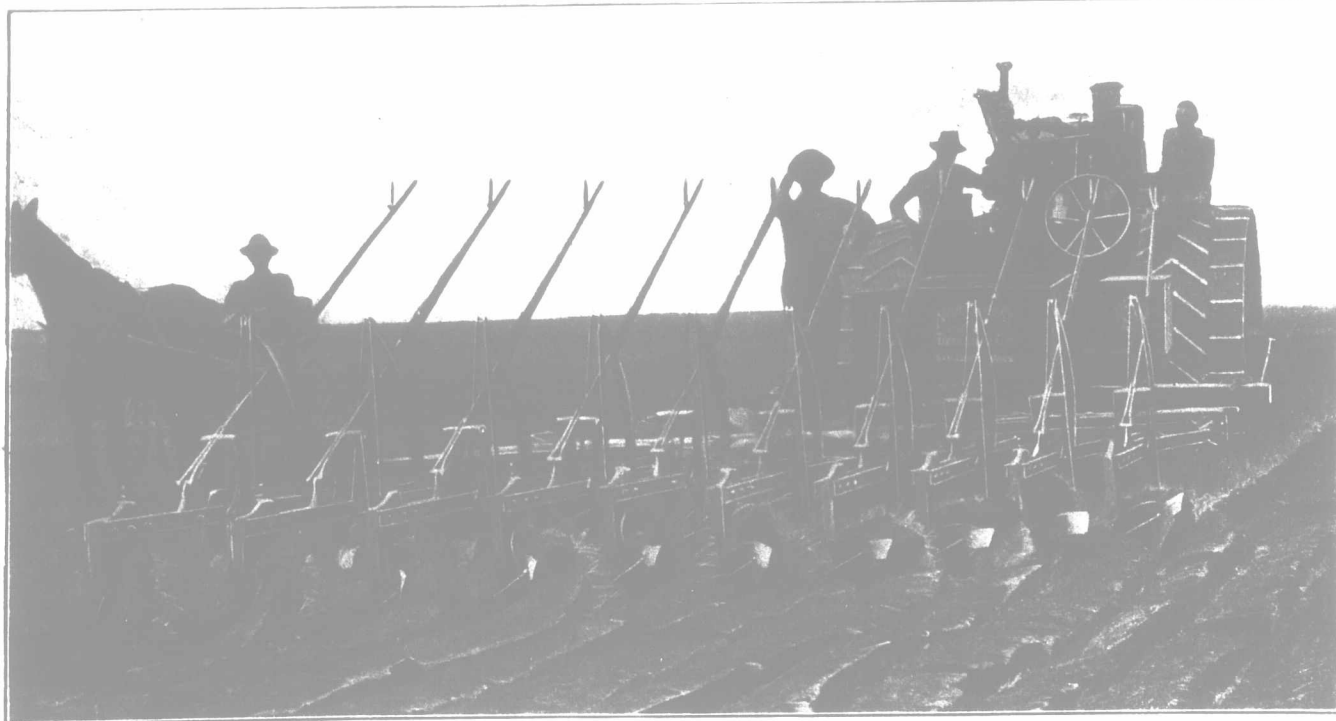
Certainly, nothing has yet come on the market which would indicate a day when the horse could be entirely dispensed with, so that some horses must always be figured on. Thus, the tractor question becomes of more importance to the man with a big band of idle horses on his hands all winter than to the man with only two or three spare horses over and above the teams which he must keep for winter use anyway.

The future of traction cultivation is a subject of great interest, but to attempt to forecast it is idle speculation. Time will soon tell what it will be. When the developments in steam plowing during the past five or ten years are considered, and it is remembered that it is now possible, in large districts throughout the West, to plow for \$1.50 per acre, land that no man would undertake to plow with horses for less than \$3.00 or \$4.00 per acre, it is at least evident that the whole proposition will bear close watching by the progressive farmer who realizes that it is just as good business to effect an economy in production as to secure a higher price for his produce, be it grain or hay.

Old and New in Plowing.

In this issue engravings appear contrasting the old and the new in plowing, one the Ingalls & Schroder outfit, at High River, Alberta, breaking prairie with a 14-furrow, 14-inch Cockshutt gang; the other is the "twal owsen plow," reproduced from the annals of the Garroch Farmers' Club ("A Century of Aberdeenshire Farming"), Aberdeenshire, Scotland, from which we quote:

"The plow is made of a small, crooked piece of wood, at the end of which is fixed a slender, pliable piece of oak that is fastened to the yokes laid across the necks of the oxen. The man who holds the plow walks by its side, and directs it with a stick. The driver goes before the oxen, and pulls them on by a rope tied round their horns, and some people with spades follow the plow to level the furrow and break the clods. In addition to all this, recourse was sometimes had



Steam Plowing in the West.

Ten-furrow, Fourteen-inch Cockshutt Gang Breaking at High River, Alta.