

THE PLOW

Will H. Ogilvie, in the *London Spectator*

From Egypt behind my oxen, with their stately step and slow,
Northward and east and west I went to the desert sand and the snow;
Down through the centuries, one by one, turning the clod to the shower,
Till there's never a land beneath the sun but has blossomed behind the power.

I slide through the sodden rice-fields with my grunting, hump-backed steers,
I turned the turf of the Tiber plain in Rome's imperial years;
I was left in the half-drawn furrow when Cincinnatus came,
Giving his farm for the Forum's stir to save his nation's name.

Over the seas to the north I went; white cliffs and a seaboard blue;
And my path was glad in the English grass as my stout, red Devons drew;
My path was glad in the English grass, for behind me rippled and curled
The corn that was life to the sailormen that sailed the ships of the world.

And later I went to the north again, and day by day drew down
A little more of the purple hills to join my kingdom brown;
And the whaups wheeled out to the moorland, but the gay gulls stayed with me
Where the Clydesdales drummed a marching song with their feathered feet
on the lea.

Then the new lands called me westward; I found on the prairies wide
A toil to my stoutest daring and a foe to test my pride;
But I stooped my strength to the stiff, black loam, and I found my labor sweet
As I loosened the soil that was trampled firm by a million buffaloes' feet.

Then farther away to the northward; outward and outward still,
(But idle I crossed the Rockies, for there no plow may till!)
Till I won to the plains unending, and there on the edge of the snow
I ribbed them the fenceless wheat fields, and taught them to reap and sow.

The sun of the Southland called me; I turned her the rich brown lines
Where the paramatta peach trees grow and her green Mildura vines;
I drove her cattle before me, her dust and her dying sheep,
I painted her rich plains golden, and taught her to sow and reap.

From Egypt behind my oxen, with stately step and slow,
I have carried your weightiest burdens, ye toilers that reap and sow
I am the ruler, the king, and I hold the world in fee;
Sword upon sword may ring, but the triumph shall rest with me.

Development of the Small Tractor

1885 (one year before grandfather was born) was a cold winter in Warren County Pennsylvania. There was lots of snow and good sleighing for the teams. My Great Grandfather, Jackson Raymond was running a small dairy that year and Great Grandmother kept a diary. On Jan 30 we find Jackson drawing manure with the steers and again in Feb using the same oxen in the hemlock woods drawing out logs. Later in March and April I found two references to him using the oxen to “draw down hay” from the hay barn that was located out in the field. In those days, working with oxen in the hot summertime, it was impracticable to haul the hay any distance and so they put up barns right in the fields to hold the crop. Dad told me when I was a boy the “stable” as we called it where we milked cows was actually two of these hay barns moved in and put together. Apparently Great Granddad was using the oxen yet for field work because I find May 11 “Jack commenced plowing his corn ground, It is a large piece” and then May 14 “Jack finished his corn ground. He turned the oxen into the pasture. Jack is 36 years old today” The corn was then planted by first using a “marker” borrowed from the neighbor Charlie Spencer, and pulled lengthwise and crosswise over the field to mark the hills. Then he and Uncle Oscar who was a boy of 14 at the time walked the field planting the kernels of corn. I’ve planted in enough “skips” with my dad I can see them now, using the hoe to make the hill and dropping a few kernels as they step ahead covering the seed with their foot and firming the soil as they make the next hill with the hoe and so forth, crossing and re-crossing the field almost as fast as a man would walk. Entries follow telling of the progress, cultivating, fence building, and marketing butter at 18 cents which seems to be a good price. The haying commenced July 8 and was the major event until completed. Oscar seems to have been driving the horse mower and rake and there are references to the men mowing “by hand” which I would presume being that they used the time honored scythe. I know when I was still a boy my

dad taught me to cut with a scythe and I still like to get mine out from time to time trimming up weeds around the place. It has become a lost art and very few men know how to use one. I'll end this with the entry from July 31, "very warm. Jack's shoulder is no better & I don't know as it is well. It pains him bad by spells. The men finished the haying tonight and we are all glad. Connie and Occa got the last load after supper. Edson had to go to play. I helped Jack milk, all hands paid off, 90 loads of hay." (Connie was a hired man, Mr. Edson was a man they were changing work with)

The late 1800s were a time of rapid change. Already in 1885 Steam traction engines were becoming popular and grain was bound with mechanical harvesters and threshed with power derived from wood or coal instead of hay. The first oil powered tractor was put together and everybody wondered, "Would it go?" As always with any new thing there was resistance to change.

Wed June 3, 1885

"Jack plowed and I mended some. Hite Dutton was here this evening & said the directors had voted to put patent seats in all the school houses. Jack don't like it"

I find lots of resistance and the farmer felt threatened by this new rival to the horse.

The first steam traction steered by horses partly though a belief that in meeting other teams on the road the horses would not become alarmed. Many states put restrictions on travel and laws were passed prohibiting traction engines from using hard surfaced roads. The American Threshermans organization lobbied for better bridges and hence safer travel for the heavy engines. Pennsylvania had spent a lot of money for highway repairs and sought to prohibit traction engine travel on all roads maintained by that state. But in spite of first resistance power farming was here to stay and farmers needed information to help guide their decisions.

Winnipeg Ontario was the setting for some of the first big publicity for Power Farming. The early 1900s saw steam traction being used

for breaking the prairies in large fashion. Men have always wanted to know that they could do something better and faster than their peers.

Translation of Greek poet Theocritus

*To drive the Chariot, and with steady skill
To turn, and yet not break the bending wheel,
Amphytrio kindly did instruct his son.
Great in that art; for he himself had won
Vast precious prizes on the Argive plains:
And still the chariot which he drove remains,
Never hurt in its course, although time had broke the falling reins.*

From the time of Christ there were pitted men against men and horse against horse in tests of power and speed. Racing chariots in the Hippodrome and the Circus Maximus was a pastime that everyone enjoyed. So when the major tractor manufacturers of the world met at Winnipeg it was all Speed, Distance, and Bustle. To quote a little bit from men who were there in 1908, “Clouds of smoke and hissing steam, a broad prairie stretching for miles without a break, save for the distant mirage; here and there a tiny prairie fire held in leash by bands of blackened earth; dust and heat; throngs of eager spectators; the song of vibrant steel and the crackling roots of age-old sod- imagine all of this, add to it the sight of a score of monster engines pulling leviathan plows, and you have a faint picture of the Winnipeg Plowing Contest.”

The shining steel plows like the prow of ships cutting their path through the sea of vernal grass with lines of fluttering flags to guide the engineer on his way, 20 ton engines mere ants on the landscape and in the distance a city of tents where factory men meet you to ply their wares. Refreshment tents, excursion trains, busy autos running errands for the slow moving tractors, or whisking the crew back and forth you feel the spirit of a modern carnival. Men standing everywhere in pairs or in small groups and

all taking turns expressing their opinions on the work being done here. The work that for centuries had been done by brute and brawn was now being done in minutes by smoke and steel. Then at twilight the quiet cattle come out of the shadows and wander aimlessly upon the upturned sward and you wonder... What did we see here today?

In the beginning farmers were unfamiliar with any kind of power farming. As early as 1850 Horace Greeley mentions in the New York Tribune that he had seen at Watertown, N. Y., a portable steam engine for farm use, and his comments upon its work would indicate that but little was known of such engines. During the Civil war the high cost of iron and steel made it impracticable to put on the market engines for threshing purposes at a price within the means of Farmers and Thresherman, and it was not until several years after that manufacturers of threshing machinery turned their attention seriously to building them. As soon as the success of steam threshing was demonstrated, they brought out portable engines, at first of six and eight horse power, but later on of greater capacity, as the trade demanded. The most important improvement that was made was in the development of a durable traction gear, but many minor inventions have been added. A few select men had been introduced to steam power and they were an elite group running engines doing custom work for others. As the Western lands started to become settled there was a need to break large tracts of virgin prairie and steam traction engines were pressed into service to pull gangs of plows. Manufacturers then began to strengthen axles and gearing to meet the rigors of heavy plowing. About 1908 the steam plowing tractor had reached the zenith of its development and engineers were clamoring for information to help them decide which units to purchase for their needs. By that time they were pulling large gangs of plows turning ten, twelve or more furrows at a time.

1909 Winnipeg Industrial Association conducted its second farm-motor competition (first in 1908) with an entry list of 22 machines,

of which 18 took part in the trials, and unusual interest was aroused both among the manufacturers and the farmers.

The tests comprised of:

Two-hour brake run.

Demonstrations of hauling and plowing

Machines examined with respect to design and construction

Accessibility and protection from mud and dust

Ease of operation

Clearance of working parts from the ground.

The type included both internal combustion and steam; the gas tractors being divided into three classes, according to horsepower.

For the brake test a special rope-brake had been constructed by the engineer in charge, and this was applied to each motor in turn. Careful records were kept of the load applied and the speed of the motor, its' consumption-- of water and of coal or wood, if steam, and of gasoline or kerosene, if internal combustion. These tests averaged in length two hours. The hauling demonstration was held over a soft and gravelly piece of ground half a mile long, which was traversed about ten times by each machine. The load, distance, time, fuel consumed, and drawbar pull were recorded. The plowing test was extremely interesting, although the results depended as much on the plows as on the tractors.

As these tests gained in popularity many were established across the country and in Europe as well.

Kansas City, St Louis, Hutchinson KS, Champaign IL, Sioux City, Bloomington IL, Enid Ok, Fremont NE, Cedar Rapids IA, Indianapolis, Madison WI, and Dallas TX all held shows for a time with the last one being held at Fremont NE 1917. The soil at Fremont was preferred by manufacturers as it was sandy and made for a better showing for their products.



Two large rope brakes

These were big National Shows attracting large crowds. Reporting for the Cedar Rapids Gazette the journalist states:

“Last Wednesday, Fremont was eaten out of house and home. The crowd drank the well dry, ate every sandwich it could find, drank all the pop and soft drinks and even drank the brewery dry. Two wagon loads of hot pop were commandeered by the crowd two blocks from the show ground and it was drunk on the spot. Two carloads of watermelons were sold, each cut in eight pieces and each slice sold for ten cents. One thousand, five hundred chickens were devoured by the largest crowd in Fremont history.”

The “Nebraska Farmer” said the city had been “taken by storm” Restaurants and cafes were unable to feed the mob. Visitors “almost bought out grocery stores, bakeries, and butcher shops and

left the shelves bare”. The Omaha Daily News noted that the hordes had come from seven different states.

But by 1917 the tractors demonstrations had served their purpose and had introduced the American Farmer to a new era of mechanical crop production.

From Harvester World 1907

Educational Value to the Farmer of State Fairs

By Edwin L. Babkeu of I II C Service Bureau

“There are so many things we want to know, and so many things we ought to know, and so many things we think we know that we do not know, that the fair, founded in the days of our grandsires, has developed into a farmer's center of findout-and-be-sure-for-yourself.

There are persons in the world (mostly city jakes who live to learn better) that imagine fairs were invented for the benefit of pink lemonade venders, merry-go-round proprietors, and fat lady exhibitions. But this is not true. Fairs have increased in size and value not because of these more or less happy diversions, but in spite of them.

Woodrow Wilson, who was president of Princeton University, and who now is Governor-elect of New Jersey, in an impassioned moment exclaimed that many of our colleges are a kind o' three-ring circus, with the social and athletic activities holding down the rings and the educational features turned into side shows. At the state fair the educational features fill the rings and the space back of the big tent, and the side shows are where they should be—on the side.

The state fair is a high school of agriculture, where the courses of study are easy and pleasant, but impressive. And the county fair bears about the same relation to the state fair that the primary grades do to the high school.

Someway, somehow, you know, we forget much of what we hear; but somehow, somehow, you know, we remember much of what we see. And in this is held the secret of the success of the fair. It carries instruction home through the eye; it is an animated picture book, with the leaves constantly turning. Reduced to few words, life is merely a kindergarten, and men and women are merely children grown tall. There is always something new to see — something to learn — and to pass from exhibit to exhibit at a fair furnishes children of larger growth with information in the same delightful way that picture books furnish it for the little tots at home.

The state fair is the agricultural roundup of the year; the after-harvest business vacation. Agent meets agent, dealer meets dealer, farmer meets farmer, and all meet each other. And they mingle in a big week of talk, argument, comparison, and demonstration.

A printed record of the fairs, from the first to the last one just closed, would make a splendid record of the progress of agriculture and the development of the machines that have given the farmer his independence.

And then there is the spirit of contest. That is a big item. Animal is matched against animal, grain against grain, fruit against fruit, and machine against machine. We all love the blue ribbon, and we crane our necks to see it pinned on the winner. The ribbon is not so much in itself; but winning it — ah! That's the thing."

Interesting and informative as they were the tests left much to be desired. By the time the Fremont Nebraska Demonstrations reached their peak in 1917 3000 acres were plowed by 46 Tractor manufacturers centered about a veritable tent city in a Nebraska Cornfield. Tractors went out and plowed whenever their crews liked and no particular records were kept of ground covered or fuel expended. What the Shows had become is more like what we see

today at the large trade shows with every manufacturer trying to look his best and doing whatever he can to promote that illusion.

A couple of years ago I was at Husker Harvest Days, a large Midwest farm show and the Toyota Tundra was pitted against the Chevy Duramax on a dynamometer under a big tent. They would run the engines close to wide open throttle to show that the Gasoline powered Toyota would produce as much torque as the Chevy diesel. What made me chuckle is that they had big box fans hanging in front of radiators to help with cooling. While it was probably needed for the lowly Toyota the ONLY reason the duplicate fan was in front of the Duromax was so it did not make the Toyota look bad! So much for an illusion.

The purpose of the demonstrations was to better acquaint farmers of the different makes, types, and sizes, etc of tractors then on the market. Of course each manufacturer is going to great expense to exhibit and demonstrate his particular machine, but the decision as to which to buy, if any, is left entirely to the purchaser. No awards or ribbons were awarded and naturally no set rules to follow either.

What was needed was more standardized testing procedures and several farm organizations and State Legislatures were clamoring for something to be done. When Wilmot Crozier took the lead and established the Nebraska Tractor Test Law on March 13, 1919 outlining “official tests of gas, gasoline, kerosene, distillate, or other liquid-fuel traction engines in the State of Nebraska, and to compel the maintenance of adequate service stations for same.”

The bill provided that:

- a stock tractor of each model sold in the state be tested and approved by a board of three engineers under State University management
- each company, dealer, or individual offering a tractor for sale in Nebraska shall have a permit

- a service station with a full supply of replacement parts for each model of tractor shall be maintained.

Results would be compared to claims made by the manufacturer. If their claims were found to be unsubstantiated then no permit would be issued.

Crozier's testing idea was not unique, but it was able to succeed where others had failed. (A National Tractor Testing Station had been fully realized in 1915, but the station was caught under a tangled web of U.S. government bureaucracy.) The American Society of Agricultural Engineers (ASAE) published a set of "Rules for Tractor Demonstrations" But as the big demonstrations ended about the time the Nebraska Test was started I don't think the rules were never used.

With the passage of Nebraska's bill, North Dakota and Missouri dropped similar legislation, assuming Nebraska law could be utilized in their states.

Testing procedures became the responsibility of the Agricultural Engineering Department at the University of Nebraska. The head of the department was L.W. Chase. Chase encouraged Iowa State University instructor Claude Shedd to become the chief engineer for the development of the Nebraska Tractor Testing Program. Shedd was responsible for setting up the tests and designing some of the necessary equipment to carry them out. (Concrete track was poured in 1956, before that it was packed dirt)

On March 31, 1920, the first tractor test was carried out on a model N Waterloo Boy.

Small tractor 3-4 plow size

The thinking in the teens was that as the tractor developed it needed to be the 3 to 4 plow size to be useful for the average farm.

There was a lot of talk of Standardization about this time and the SAE was working with engineers to solve problems applicable to tractor work. With most of 100 manufacturers (maybe closer to 200)

Tractor manufacturers in 1918

In the Tractor Field Book there are listed by my count 114 different makers. Another list for California alone from 1892- 1955 mentions 72 makers.

Everyone was using their own ideas for construction it would be readily seen that some kind of continuity would be desirable. Standard SAE bolt sizes were one major item that were considered for restriction in sizes.

- Drawbar height for plowing was fixed at 17 inches and it was hoped in 1917 that a standard clevis design could be used on all tractors of the four plow size.
- Fan belts were preferred to be the flat style as opposed to a V belt as it was thought that it would be easier for the farmer to find replacement at any hardware store or repair in the field.
- The 18 mm spark plug that we use today is something that originated in the aircraft industry and carried over into the automotive and tractor industry as well.
- Magneto bases were standardized early
- Standardized belt pulley speed of 2600 fpm as well as a standard plowing speed of 2 1/3 mph.
- A lot of other items were considered too but as manufacturers dwindled to just a few Companies later on those ideas became unnecessary and impractical. As farmers bought up the 3-4 plow sizes they found that the machines were still too clumsy and unwieldy to take the place of their horses for every day farm work. Something smaller and more practical was needed.

I believe that thinking was based on the needs for belt power for large huskers, shellers, and threshers but as smaller machines were developed it was discovered that a two plow tractor was more manageable and practical on most farms taking the place of one or two teams.

In the late teens and early 20s there was a change over to the all steel thresher, lighter running and in smaller sizes. International Harvester produced several very successful tractors, the 10-20 & 8-16 Mogul, the 10-20 Titan, and the 8-16 Junior were all immensely popular and built in large numbers. The 8-16 was the first tractor to utilize the PTO in 1918 taking rotary motion from the engine and transferring it directly to the machine gearing instead of drawing power through the wheels from ground travel which had been done previously.

This was pivotal

Most farm machines operate with some kind of rotary motion. You have seen drawings of early invention ideas; some very outlandish where mechanization of hand operations is tried to be duplicated in hand or leg reciprocating motions instead of converting to rotary motion. The hay Tedder would be an example where the rotary motion from the drive wheels was converted back to and up and down motion much like a man operating a pitchfork. Modern tedders use horizontally rotating wheels to fluff the hay.

When horses are used as motive power this rotary motion must be obtained by means of gears driven by friction wheels in contact with the ground.

Here is a key statement

“The tractor can furnish power with rotary motion without the aid of wheels and while it can not move sideways [as a horse] it moves backwards and forwards easily, giving splendid control over any machine mounted on it’s own frame, but is distinctly handicapped by a machine drawn behind it”

Absolutely!

The early engineers had the problem figured out; they just did not know yet that the Farmall was the answer!

Motor Cultivator

Unfortunately at this stage of the game it was thought that a second machine was needed for cultivating. The Motor Cultivator in various forms was toyed with by several manufacturers including International Harvester, Moline Universal (Moline Plow Company), B. F. Avery, Emerson-Brantingham, Toro, Allis-Chalmers, Parrett and Bailor produced either one or two row models. The Harvester machines like the others were based on “horse thinking” That is they mounted the cultivator on a two wheeled cart and either pushed or pulled it with the engine. The farmer rode the cultivator and steered the gangs with his feet just like the old days. The International Harvester motor cultivator also presented some distinct limitations. Its center of gravity was so high that it was dangerous to operate on hilly ground. Also, the small rear drive wheels left objectionable ruts in the field. Later models of the International included a PTO which was probably a result of the influence of E. A. Johnston and Bert Benjamin. The Moline Universal was basically a horse cultivator with a mechanical horse that could be used for other tools. In the Kansas Board of Agriculture in its 1919 Annual Report carries the idea that the Motor cultivator is just what the farmer needs and could be purchased for about the price of a 4-horse team with the cultivator thrown in free. The author states that there are not less than fifteen companies producing Motor Cultivators on a commercial scale and the only thing holding them back was public acceptance. His opinion was that it was only a question of time until the Motor Cultivator became as successful and widely used as the farm tractor.



Archives and Special Collections, University of Nebraska-Lincoln Libraries

Probably today they would sell like hotcakes, (every farmer has a 4 wheeler just to save him walking a few steps) but, in those conservative times the farmer simply would not buy a 2nd machine equipped primarily for seasonal cultivation. Consequently he bought the larger 3-4 plow tractor for his heaviest work and struggled on his daily way with his faithful horses.

Belt power limitations

It is my belief:

Threshing machines, sawmills and other heavy equipment had long been run by steam and smaller odd belt power jobs about the farm were carried out by small gasoline engines. In the beginning threshers were run with horse power, either walking in a circle or on a treadmill. Machines were built small so the horses could power them. But just like the Steam plowing & threshing outfits developed early in the century, the thinking was that Bigger was Better. Naturally as gas tractors were developed for farms that need was considered and as the small engines covered the lighter loads it was thought that the tractor needed to carry the heavier end

of the load requirements replacing the steam engine. It was not believed that a 2 plow tractor could handle those jobs. We go forward pretty well but it's hard to *back up*.

Fordson & Westinghouse

Granddad had two Fordson tractors. Dad was born in 1919 and he told me he “could not remember when they did not have them” and also that at least one of them had a wooden steering wheel which would be an early model. I do not know if grand dad purchased the tractors new or used. Dad told about working the tractors in the field. The large part of the farming was done on the Schrambling Hill farm where the fields were large. They hauled water and kerosene in milk cans and dad said it took as much water as kerosene for those Fordsons. In making a round it took most of an hour so you wanted watch the time when it came close to noon or you would be at the far end of the field when dinner was called. Dad always liked to tell the story of the day he “plowed in two states” The farm butted up against the Penna-NY state line and one day turning around on the end the plow accidentally tripped plowing a furrow on the NY state side. The Fordson could be temperamental to start. Grand dad had them rigged with Hot Shot ignition which used a dry cell battery but dad said the batteries were always dead so they were still hard to start. One day dad was hand cranking one of the Fordsons and he was built about like I am, just a skinny kid. His older brother Ed and my Grandpa were both big stout men. In fact Ed would show off by lifting the front of the Fordson off the ground and if that was not enough he would add a CWT sack of feed over the hood. Dad was cranking away and the Fordson refused to fire. Always helpful Ed says, “you have to crank it faster Harold” Dad said, “I was cranking as fast as I could”

Back to my story, Granddad had a Westinghouse thresher. One of the big old wooden jobs with mechanical stacker. He despised smaller threshers and called them “pepper boxes”. He always cut

the bundles and hand fed the Westinghouse himself managing in that way to power it with the lowly Fordson a machine that would have normally been run with a much larger power unit.

Threshers developed

In 'Correspondence' from American Thresherman July 1907 Zach Thomas Olivet, Kans from horse to steam outlines the History of the Thresher "To the editor, According to promise made you at Wichita, I will give you a short sketch of my 42 years experience as a Thresherman. Along in 1856 I helped run a ground hog separator, consisting of a frame for the cylinder and a shaker over which the straw passed, allowing the grain and chaff to pass through the openings. The cylinder had an iron shaft, cast head and two hardwood staves through which the teeth were driven. These teeth were simple staples of iron half an inch wide, some of the bars being straight as now, and others angular shape for feeding the machine easier, which was a mistaken idea. We used two horses on the tread power, changing them every thirty minutes. With all the primitive features it would thresh faster than some would think it could. The thresher had to be bodily loaded on a wagon for moving and the grain had to be run through a fanning mill, turned by hand to clean the grain. The Thresherman in those days never knew how much was coming to him until the farmer had cleaned up and told him the number of bushels that had been threshed.

After the ground hog came the "apron" machine, with undershot cylinder, including bars and bands. The holes in the bars were tapering so that the teeth might be drawn and for several years each tooth had its own "burr" and it was a question whether either the cylinder or concave teeth would fit in any other than the hole made for that purpose. In 1868 with my partner I went to Mineral Point WI and bought a complete Russell outfit, 8-horse power and 30-inch cylinder. We also bought a carrier for the straw but it did not come until late in the fall. This carrier was sixteen feet long, all in one piece and run by a chain connected to a pulley at the top of the

carrier. These apron machines were all right in wheat and oats but in flax they gave a lot of trouble. About this time the “Vibrator” began making its appearance as the flax and grass seed machine. Soon after this we had the Woodbury power (Sweep Power) mounted on two wheels with extra long neckyoke to keep the tongue from striking the horses. This style was not used long before the four-wheel power followed it and still abideth with us in some places and is not a bad power either. Then came the engine, first portable, then horse-guide traction and then the self-steering traction and then followed in order the many improvements until today we have the up-to-date separator, self feeder, and stacker, grain elevator and weigher, with the engine operating and moving the whole outfit without the aid of horses. As I look back over the last fifty years and contemplate the wonderful changes and improvements it seems impossible to believe them true. During the past five or six years the tendency for monstrous engines and correspondingly large separators has grown steadily until it is almost impossible to keep them running full of grain hence the waste of grain is greater. My experience has been that the small engine wasted much less grain than the bigger ones”

Threshers developed simultaneously with the smaller tractors.

About the mid 1920s the all steel threshers came out and were lighter running and more compact and affordable. Instead of custom operators covering a large circuit (and late harvest get to you when they can) a few neighbor farmers could team up to purchase a thresher. I know my granddad owned a steel thresher in later years “on shares” with 2 neighboring farms. They could trade work easily and get the crop harvested in a timely manner. When I was about 10 years old I was invited to spend the night with my cousin Norvel as they were planning to thresh oats the next day. I believe it was a Case machine, all steel of course and powered by one of his farm tractors. I remember how Uncle Ray was real particular in leveling the machine so it would work properly. It was

not a large operation and only a couple extra men and their boys were involved. The straw was baled directly from the wind-stacker into a New Holland baler and some boys on the wagon piled the bales. I can't imagine they were too busy. My chief job was steering the John Deere B on the bundle wagon. I was not a stranger to tractor driving but the John Deere with two cylinder engine and hand start was a little unfamiliar. I guess I can say with some honesty that that was the first time I drove an antique tractor. Dad owned a Papec silo filler with his brother and another neighbor. I can remember as a boy the silo filler being housed in a schoolhouse at the corner on Schrambling Hill. I wanted to see it work but of course dad would never pull it out. Machines such as the silo filler and the steel thresher depended upon farm tractors for power. The farmer did not have to wait on the big custom rig to come around and maybe lose the chance to get his crop in when it was at its' peak of condition. He simply called a few helpers together and made his own schedule.

Need for general purpose tractor

In 1917 Ludlow Clayden reporting on the Fremont Demonstrations says "Compared with machines participating in the demonstrations last year, it is easy to see that makers are concentrating on those types pulling three or four plows. There are fewer of the big machines that pull ten, twelve, or more plows"

The need for large plowing tractors to plow the vast virgin prairie was coming to an end and the average size farmer was starting to look at a utilitarian tractor that could replace the horses on his farm. The trend was toward the smaller more compact units. The International 8-16 was a good example. It could pull two plows and if the farmer wanted something bigger the Titan 10-20 was classed as a three plow tractor. In the mean while IH was doing a lot of work with the Motor Cultivator idea and had experimented with a reversible tractor whereon could be mounted binders, headers, mowers, and such. Many conversions were made for the

popular Fordson tractor. I found ads for line drive attachments to make it work like a horse, mounted mowers and plows, Several of the Ronning patents show what looks to be a Fordson with corn harvesting machines and a cultivator mounted.

The Moline Universal was a utility machine that held some popularity for a time but I believe it was probably too light to do all the work on the average farm. Being front driven it would not have the torque advantage for traction. On a rear drive unit the weight is transferred from the front steering wheels to the rear driving wheels creating firmer contact with the ground. With front driving wheels the opposite is obtained and traction is lost.

The Universal was basically a “Mechanical Horse” bearing the implement much as the horse did. Having to always think of the horse limited the range of vision and restricted the imagination of the inventors. Thankfully the inventors of the Farmall saw this and left off building implements to fit the tractor. That was getting them nowhere, but when they started building the tractor to meet the requirements of the attachments then they began to forge ahead. The front steering front mounted cultivator with rear drive and turning assisted by individual brakes (hanging the cultivator on the “horse”) was the concept Engineers at Harvester were trying to perfect. John Deere meanwhile was continuing work on their 'Tractivators' equipped with McVicker two-cylinder hopper-cooled engines. The first unit was completed February 17, 1917. Two of the motor cultivators were sent to the San Antonio, Texas, test grounds for earliest possible field testing and arrangements were made for each branch house to receive a tractor to work through the season under observation. When the reports began to filter back from the branch houses, the Tractivators showed a discouraging lack of capacity over a man with a one row cultivator and a team. Mechanical problems were also revealed. The one speed transmission was too slow. The engine lacked sufficient power for hilly ground and it showed an excessive consumption of lubricating oil and evaporation of water - as much as two gallons

per hour. A leaky carburetor reduced engine efficiency even further. In comparison with the International Harvester motor cultivator, even with its faults, the John Deere model could only half as much in a day and offered no advantages over a team and a one row cultivator.

The LaCross Happy Farmer, the Bull and others tried to fill the small tractor bracket for a time. Lots of things were being tried and sooner or later somebody was going to happen on a notion that would work. Henry Ford built half a million Fordsons between 1917 and 1928. Roderick Lean made a mounted mower for the Fordson. Rowe Mfg made an attachment to make the tractor drive with lines. Gleaner harvester made a mounted combine. The American husbandman was getting into Power Farming in 1920 in big ways but he had not yet broke free from his mule and his horse.

Development of the Farmall

I find it interesting reading trade magazines from the teens. From the Automotive Industries of Aug 1917, "They [implement makers] are waking up to the tractor and the increased scope it gives them. It is not to be expected that the awakening will be rapid, but ten years hence will show a complete upheaval in farm engineering, and the dawn of a new era is just breaking" "The world has never before seen any parallel case. It has never been necessary completely to alter the construction of an accepted machine to suit a new available source of power" "As a rule new machines come complete but in this case the tractor is only a portion of the many new machines that will come swiftly" "**New era**" **indeed**, Ten years later saw the production of the Farmall just coming into complete fruition.

From Company records it seems they were building up and down the Farmall tractor and the Motor Cultivator all during the teen years. Nobody could decide which direction they should head. But

as ideas for individual steering brakes, attachments for forward mounted cultivators, (if you understand geometry at all you can see how a front mounted front steered cultivator would be able to be corrected much more readily than one mounted further back) and a special drawbar for trailed attachments came into correlation one with another the Farmall tractor began to take shape.

In 1920 Bert Benjamin wrote Alexander Legge proposing a Farmall plan which would eliminate horses entirely. McCormick Works under the direction of Mr. Benjamin developed 2-row corn snapper and 2-row cultivator attachments for the Farmall tractor. The first drawings covering the Farmall, as it finally went into production and of substantially the same construction as the present Farmall, were made August 12 1921 and twenty of these machines were completed early in 1922.

Here is an interesting little tidbit: The main rear housing on the Farmall is made of steel and not grey iron as the other castings. In a letter dated 1926 it seems it was proposed that the housing be made of grey iron. The letter expressed concerns of safety and the farmer's life being jeopardized and that careful consideration be taken as to any changes along that line. Apparently the letter was well received as no changes were made.

Have you ever wondered about the little curve at the outside edge of the Farmall drawbar? It was patented by Bert Benjamin & C R Raney to pull check row planters. It allowed the hitch to slide on the drawbar from one side to the other in turning and the wheel track was followed for the next pass eliminating the need for a marker.

July 19, 1927.

B. R. BENJAMIN ET AL

1,636,276

TRACTOR DRAWBAR

Filed April 9, 1924

Fig. 1.

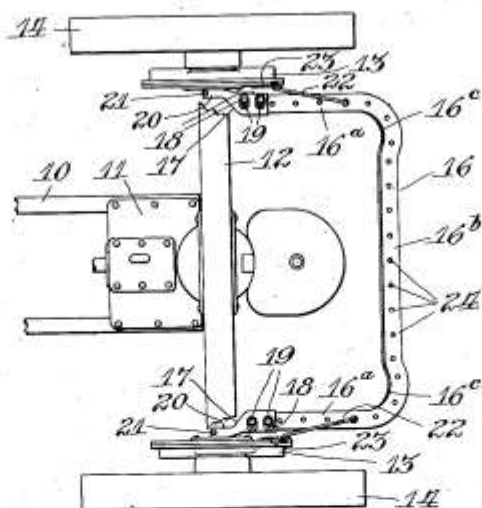


Fig. 3.

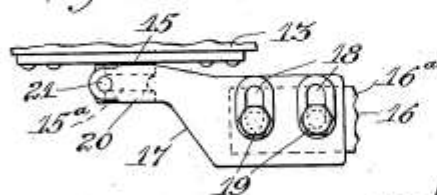


Fig. 2.

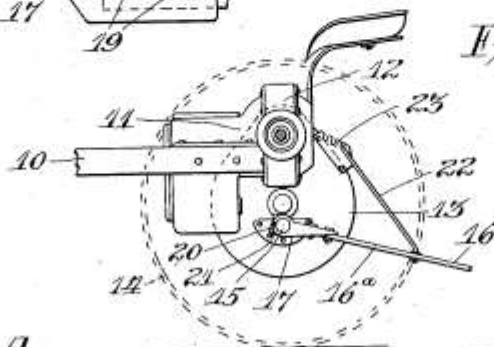
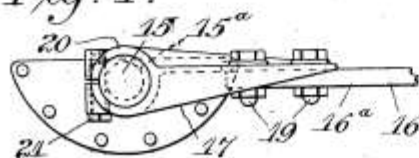


Fig. 4.



Inventors:
 Bert R. Benjamin
 and Clemens R. Raney,
 By *H. P. Seale*
 Att'y.

Steering brakes patented by Benjamin and royalties paid to Ronning who had patents dating from 1916 for a front mounted tractor cultivator that used brakes to aid turning. Also Froelich had patents for steering gears using turning brakes as early as 1918 The patents of International Harvester submitted by Benjamin and others all show steering brakes too, The later drawings using the cables that went into the production machines. Ronning's patents were entirely different but they must have been well enough written to protect the Idea. I don't pretend to know anything about patent law. In 1874 a farmer was disgusted with the accumulated dirt in the end of his watch key, he said, "I fix you, you obstinate SOB" Which he did by drilling a hole at a right angle through the stem where-by he could blow into it and expel the dirt. He discovered however that the hole had the effect of making the key self cleaning so he proceeded to patent his idea; his hole. In any case it was ruled that Harvester pay Ronning royalty of \$1.00 for each Farmall produced whether it was sold with a cultivator or not.

At the very onset and throughout the early production years I am convinced that neither the engineers nor management at International Harvester knew what they had. Sure, the engineers thought they had some good ideas and perhaps the farmer would be willing to give it a try. Company wide there had been a constant cry for a tractor to meet Henry Ford's Fordson. Ed Johnson, manager of the Experimental Department, said that "It was impossible to meet Ford on price and that they would have to produce something of greater utility". In his judgment the Farmall was the answer. Administration must have thought the concept had promise but they had just spent a lot of money on research and tooling gearing up to produce the rock solid 10-20 and 15-30 models and did not want to jeopardize sales of those. Mr. Johnson did add that if the 10-20 were killed it was better for Harvester to do it than wait for somebody else to do it for them. Production started off slowly, from 200 in 1924, slightly more in 1925 and a

few thousand in 1926. And up to this point the tractor had not been nationally advertized. When production finally got under way in earnest about 1927 the 10-20 was still selling well. Very well and I believe their fears in that regard were unfounded. This is the way the Farmall was sold: The Company put the Farmall out to the farmer with the understanding that it would be called for in a week or 10 days and in the meantime the prospect had the liberty to use the tractor as much as he pleased. Very rarely was the Company man permitted to remove the tractor from the farm once it had been tried. One Company man was visiting a Branch in Texas and went out with the salesman to pick up a tractor but the man was stalling as he wanted to finish his spring work and put off purchase til fall. So the men went out to the farm with another man to drive the tractor in. When the farmer see they meant business he said, "OK boys leave the tractor, I will follow you in and settle for it" And he did just that. The man stated that he thought a lot of tractors were sold that way.

I don't think I ever saw a Farmall Regular until I came west in 1979. I grew up in northwest Pennsylvania dairy country and the tractors there were smaller utility models. Granddad had two Fordsons and later two Ford-Fergusons. My earliest recollection is having one of the Ford-Fergusons (my dad's brother Ed had the mate to it) and Dad bought a slightly used Ferguson 30 when I was just old enough to remember it. Later about the time I started school dad bought a WD Allis Chalmers from his brother and that was our "big" tractor. Dad told me once that before Granddad bought the Fords that the Case dealer had tried to sell him a tractor. I'd guess it was a Model C. Other neighbors had Fords and Fergusons too. One old bachelor dairyman had a Farmall H and would go by on his way to harvest corn. It looked like a pretty big tractor to me and being tricycle front end made me envious of it. There were a few F12s in the area but they had fallen into disuse by the time I was born.

When I was a teenager I went to work for an old Dutchman Carl Damcott in Clymer NY. He was born in 1910 or so and grew up working in the Garage in town and on the farm with his twin brother. I believe they had a Titan on the farm and threshed with it some. Carl worked for Clymer Lumber Co in the 40s when they sold IH. He also worked for a time for Hank Pardee in Panama selling Fergusons and learned to plow with them against bigger tractors. He liked to tell of a plowing demonstration when He was working for the IH dealership. I believe it was a Farmall H he was using and the boss told him to put the plow in the ground “just as deep as he could pull it” He did and when the Ferguson driver dropped in his deep furrow he was all done. Just a little trick to make the competition look silly but it worked. He was always a big supporter of IH equipment and nobody could tell him it was anything but the best. So I guess I had those things ingrained in my mind. Carl was a dealer himself in the 60s and sold and repaired everything himself. When his wife passed away about 1970 IH was pushing him to sell more. They wanted him to order combines and other stuff that he knew he did not want to sell and keep service parts for. So they took his dealership away. When the Company man came to close him out he started picking up books, parts books and service manuals. Carl was concerned as he felt it was still his responsibility to service what he had sold. He stopped the man and told him, “some of those books I bought and paid for, how do you know which ones are which? So the man did leave some of the stuff and that’s what we used to order parts from another dealer. As long as I worked for Carl he was always faithful to stock parts for the tractors he would service. One customer had three or four Farmall Ms and a pair of 300 Utilities that had been apart so many times we knew them by heart. We did all that mans service work, even oil changes. I remember hearing on the radio a few years ago we had a very hot spell of weather here in Nebraska and the feedlots were loosing a lot of cattle. It got to the point that the rendering plants had more cattle than they could use. One rendering plant at Lexington NE continued to pick up the dead

cattle free of charge and dispose of the carcasses at his own expense. "I owe it to my customers" he said. That's the kind of a man Carl was too.

During 1928 Farmall production rose from 65 units a day to 125 Farmalls daily by June and by January 1930 the Farmall Works was shucking out 200 tractors a day. The 100,000th Farmall was built April 12, 1930 and the American corn-belt farmer knew that the tricycle type tractor was what he wanted for his row crop work. The Mechanical Horse had come home to stay. Other manufacturers frantically shoved their ideas on the market and with some success and demand was such up through mid century that almost anything that would pull a plow could be sold. The post WWII years were a big farming boom. I had a neighbor tell me he bought a quarter section of ground planted to wheat. He bought a new combine and later that year harvested the wheat and paid for the land AND the combine with the proceeds of the crop.



The millionth Farmall tractor on display, likely at International Harvester's "100 Years in Chicago" celebration. A sign reads: "The Millionth FARMALL Tractor built recently at Farmall Works, Rock Island, Illinois. It is a FARMALL M, the largest of the FARMALL family, destined to work on a large farm. Of the million FARMALL tractors delivered to American farms, over a period of 24 years, nearly all are still on the job. [1947]

In 1959 farmers were introduced to Atrazine to control weeds in corn, grain sorghum, sugar cane and other crops. No longer would they have to stop their haying and other pressing summer work to spend long days cultivating corn. I can remember dad moving the wheels out to fit the rows on the Ferguson 30 for planting and cultivating. I think in those days he kept the mowing machine on the little Ford-Ferguson so he didn't have to take it on and off. I was just a little kid when he bought the first field sprayer. It was a used model that went on the 3 point hitch and had two 55 gal barrels to hold the spray solution. I think he could get over about 5 acres between refills. When I got into high school I did most of the spraying while dad was milking after supper. Just a few hours freed us from long hot hours up and down the long rows of corn. The cultivators lay rusting behind the barn to maybe be pulled out to work the garden. We went to 30 inch rows and no longer had to set the wheels in and out but the same spacing we used for planting could work for the tractor all year. Haying was better suited to utility tractors of the 4 wheel type straddling the hay and not mashing it down. The old tricycle tractors in the neighborhood sat idly by or maybe shuttled wagons to the barn. The neighbor next door had a late model John Deere B that he mowed weeds with. We had a tricycle M for a while that we used for hauling manure when the other tractors were in the hay field. The Farmall tractor with its innovative steerable shifting gang cultivator had filled a need for nearly 50 years. Dad's gone now, Gone since Groundhog Day in O'seven. A lot of the old Farmalls are gone. Most all the Fordsons are gone; the old timers I knew as a kid are gone. When I was a kid I would hang around the old men and listen. I'd learn what things were and how they were used. The bachelor neighbor to the south, Claus Spencer, (son of the man Great Granddad borrowed the "marker" from) was an old man when I was a kid. He drove daily until his eyesight failed and then he walked to a close neighbor to take his meals. I remember he had the nicest herd of Black Angus cattle. He did all his field work with a Ford tractor, probably an 800 series and the Papec field chopper was powered

with a Red Seal engine. Dewey Volk was another bachelor neighbor who was already in his seventies when I knew him and his aging father was still living. The old man had a wooden chair down by the railroad tracks where he would set and watch the trains on nice days. Dewey had an old sawmill site up in the woods and from there I snaked down the engine from a Gray automobile. Dewey restored a Model T Ford Car and fixed up a camper on the back of a 1950 something Chevy Apache pickup the he drove to Florida winters. My Grandmother Raymond passed away when I was 15 years old. When she was a girl he cousin Frank Barnes had lived with her family. (She called him Uncle Frank) Frank was a veteran of the Civil War and when I was in grade school and learning about that war Grandma actually taught me war songs that she had learned from Uncle Frank. "Tenting on the old Camp Ground" John Browns Body" "Marching through Georgia" and others I've forgotten. When she passed away I was given a wool blanket made by her grandmother, Amanda Berry about 1845, hand spun and hand woven which I sill have today, stored safely away in "Uncle" Frank's war trunk along with the Jersey bull lap robe that was my grandparents. I did not mean to digress so far from the developments of the Farmall but these things are all related in a way you see. And it up to those of us that remain to preserve what heritage we can. Take time to share what you have known and seen with the younger generation around you. Take time to teach them how to feed a horse or milk a cow. Grab a gunny sack and show a youngster how to hold the mouth of the sack open with extended fingers so you can scoop grain into it. Then jump in your auto and go buy them an ice cream cone. The child will remember you forever.