FRIENDS OF THE LESTER F. LARSEN

TRACTOR TEST AND POWER MUSEUM

NEWSLETTER NUMBER TW0 (11/18/98)

This is to announce the First Annual Meeting of the Friends of the Lester F. Larsen Tractor Test and Power Museum, to be held on January 19, 1999 at 1:30PM in the Museum. We now have steam heat restored to the building although, funding being available, this will be temporary. The steam heating system is quite antiquated, having been installed in 1919. Our condensate return line is plugged and the consensate is currently being carried through a hose to a floor drain. We are hoping to receive some of the heating equipment which will be taken from the press box at the football stadium, now being removed and replaced by the $1million private boxes. The Museum has natural gas service which is not being used but would serve as a more energy efficient system.

We have yet to replace the electrical wiring which was removed during the replacement of the roof. Hopefully that can be accomplished in time for the annual meeting. The toilet needs to be updated, we need to develop a second pedestrian exit to meet OSHA requirements, re-work or replace two of the large doors and get our exhibits properly displayed. We have enough projects to keep from getting bored.

Thanks to the efforts of Bob Kleis, we have a functioning library. Files for all tractors submitted for test and test reports are now easily obtainable. We have responded to a number of requests for information on tractors. We also have slides and photographs, including those donated from Frank Walter's estate by his wife Charlotte.The office has been upgraded and the computer which is being used for this newsletter sits where the planimeter table formerly resided. Gradually we are moving toward having an operating museum.

We had eight tractors and the 1925 Model T on exhibit at State Fair again this year. This display of antique tractors and a parade of these tractors each day was initiated by Les Larsen. We are pleased to continue the program, which has become one of the more popular activities at State Fair now the the manufacturers have moved their displays and demonstrations to Husker Harvest Days at Grand Island.

This year we had an extra activity at State Fair. Roger Welsch, who hosts the "Postcard from Nebraska" segment on CBS Sunday Morning, and another talk show Friday evenings on Educational TV, also has an interest in restoring old tractors. His specialty is Allis-Chalmers WC's., about which he has written two popular books, "Old Tractors and the Men Who Love Them" and "Busted Tractors and Rusty Knuckles". He has donated one tractor which he calls "The Woodpecker" because it was sitting in a fence row with trees growing though it before he restored it, to the Museum to be awarded to the winner of a national lottery. This is in cooperation with Dave Mowitz of Successful Farming, who provided the raffle tickets and Dave will be running a promotion in the magazine and in

"Ageless Iron". We have received several hundred dollars so far and hope this will provide enough support to accomplish some of the remaining renovation projects.

We would be very happy to sell you or your friends tickets. They are $1 each or 6 for $5. The drawing will be held September 6, 1999 at the State Fair. You do not have to be present to win. I can verify that the tractor runs as I drove it in the tractor parade at State Fair.

We have had our first act of vandalism. Four students from Wisconsin were visiting their fraternity in Lincoln and evidently decided they would like to return with the sign designating the Museum which was dedicated May 2, 1998. The campus police noticed them driving with the sign in the back of their pickup, became suspicious and stopped them. Three of them ran, leaving one holding the sign. All four found themselves in jail and the sign will be restored at no expense to us. Unfortunately they also pulled the sparkplug wires and removed a gas cap from a Case CC which we had sitting outside of the museum. We recovered three of the wires but the cap will be hard to replace.

The operation of the Museum is based totally on contributions. Therefore we need your continued support through gifting to the UNL Foundation, 1111 Lincoln Mall, Lincoln, NE 68508. Our Museum account number is 4182.

Now to the business of the First Annual Meeting. In addition to enjoying the company of people with similar good taste, as well as some cookies and punch for refreshments, we have some essential business to attend to. We are in discussion with University administrators concerning a joint adminstration with the State Museum (Elephant Hall). This would provide a direct linkage with professionals in museum management, displays, renovation and graduate students in Museum Studies. It is important that the structure of the museum be set up for long term development and operation. Another essential activity to assure the continuity of the program will be through election of officers and board members.

So mark this time and date on your calendar and plan to attend. To assure that we have a sufficient number of cookies it would be helpful if you would give me a call at 402-472-5511 or drop a line at 202 BSEL, UNL, Lincoln, NE 68583 and let me know you are coming.

In the meantime, enjoy the attached article on the Winnipeg Plowing Contest, have a merry Christmas and endure a New Years without Nebraska competing for a national title.

# THE WINNIPEG PLOWING CONTESTS

With the introduction of steam powered traction engines in the latter 1800's and internal combustion powered traction engines in the early 1900's there was little information available to farmers to guide them in the purchase of such machines. The majority of farmers had no knowledge of or experience with either type of engine except for the operators of steam powered tractors, used primarily for threshing and for plowing. The operators of these machines were regarded with high respect by the community.

In the early 1900's, a number of agricultural colleges established tractor operator courses during the winter months where farmers were instructed in the care, repair and operation of the steam and gasoline powered tractor. At the University of Nebraska these courses were offered in the agricultural mechanics building located on the Farm (now East Campus). Even with this knowledge, no means existed for comparing one tractor's performance with that of another make, other than the advertising claims, which commonly extolled the merits of the particular tractor far beyond achievable levels of performance.

There was obviously a need for information based on neutral observation which would allow a farmer to select a tractor for his particular needs. Manufacturers were entering the market with machines having a wide spectrum of designs and components. Engines had vertical or horizontal cylinders, single or multiple in number. Cooling was often achieved by exposing the cooling water directly to the atmosphere, flowing it over a screen for example. Everyone had a better design for a carburetor. Steering often required significant upper body strength. The significant question of the day was what parameters should be evaluated to provide a fair basis for comparison.

The first such comparisons were called the Winnipeg Plowing Contests which were held in conjunction with the Winnipeg Industrial Exhibition in Winnipeg, Canada from 1908 to 1913. Fortunately, L. W. Chase, who was Head of the Agricultural Engineering Department at the University of Nebraska attended all contests, serving as a judge in 1910 and 1912and as Engineer in Charge in 1913. He compiled a detailed report on the test procedures and results which we have in our Departmental Library. It is interesting to see how the testing process developed, leading to the basis for the Nebraska Tractor Tests.

In Chase's words the 1908 contest consisted of "having the engines go out and pull a few loads and then do a little plowing, after which the judges, by looking the engines over, would award the prizes". Obviously Chase was not impressed with the procedure. However, measurements were made for six tractors. The "hauling test" consisted of pulling a load and measuring fuel and water consumption. The results were reported in pounds of fuel and pounds of water per ton mile. The plowing tests consisted of plowing a given acreage and reporting the pounds of fuel and pounds of water used per acre. As you can appreciate, there are so many variables entering into these tests that realistic comparisons were mostly a matter of judgement.

In 1909 the Prony brake was introduced to determine belt horsepower and a traction dynamometer was used to measure hauling and plowing performance. Gasoline powered tractors were classified in power classes, A being 20HP and below, B being from 20 to 30 HP and C being above 30HP. Steam tractors were placed in class E and ranged from 67 to 105HP. For the prony brake tests engine efficiencies ranged from 4.7 to 11.8 HPhrs/gal. The most efficient tractor was an IHC rated at 24.9 HP. This value is quite surprising since gasoline powered tractors, which were last tested in 1976 (manufactures had switched to diesel) were in that range. For example, the Massey Ferguson 230 was found to operate at 11.85 HPhrs/gal and an IHC 666 operated at 12.76 HPhrs/gal. Is something wrong? Let's check further.

In 1910 twelve gasoline powered tractors were tested and fuel efficiencies on the 2 hour economy brake test (wonder where the two hour tests originated?) ranged from 4.08 to 10.1 HPhrs/gal. The most efficient tractor was an IHC which developed 46.49 HP. This year they dropped the hauling test. It is interesting to note than another important criterion was the amount of water used. One rating was HPhrs/100 gal. of water. Here ratings ranged from a low of 391 to a maximum of 4015.

In 1911 fifteen gasoline powered tractors were tested and fuel efficiencies on the 2 hour prony brake test ranged from 7.02 to 10.56 HPhrs/gal. The most efficient tractor was an Aultman-Taylor which developed 58.93 HP.

In 1912 twelve gasoline powered tractors, four kerosene tractors and eight steam tractors. Of the gasoline tractors, fuel efficiencies ranged from 6.79 to 11.08 HPhrs/gal. Again the Aultman-Taylor, rated at 58.6 HP was most efficient.

The year 1913 was the last year of the tests. Here J.I.Case Company dominated the entries, having 4 of the 8 tractors entered in the gasoline category, 3 of the 5 tractors in the kerosene category and 3 of the 6 steam tractors. Fuel efficiencies in the Economy Brake Test ranged from 7.8 to 11.64 HPhrs/gal, with an Avery tractor rated at 61.1 HP having the top efficiency.

Although we cannot compare the fuel efficiencies directly with the more modern tests since Imperial gallons were listed as 7 lbs/gal , compared with a value of 7.32 today, it is interesting to note that the top efficiency ratings for each year were within the range found for gasoline powered tractors as late as 1976. Although the newer test equipment was more refined than the simple setup used by the early tests, there the prony brake rested directly on a scale and a tachometer and stopwatch were used, compared to the electronic curcuitry used today, it would appear that the engineers running the tests were very concerned with accuracy. Not having some of the modern parasitic loads imposed by cooling fan, hydraulic steering, hydraulic lift and air conditioning, the conclusion is that some early developers of gasoline powered tractors were able to achieve very respectable performance.

Professor Chase ascribes the termination of the tests in 1913 as a consequence of a poor crop year in Canada and loss of interest on the part of manufacturers to pay the $50 fee to enter. In an effort to be as fair as possible, the judges had developed a scorecard system for rating the tractors. There were 35 rules and conditions that the manufacturers were required to comply with. Various performance parameters were given a maximum number of points allowed, such as HPhrs/lb. fuel being worth 130 points for gasoline powered tractors. HPhrs/lb. water was worth 20 points. A nomograph was developed to read off the number of points up to the 130 maximum which various fuel efficiencies warranted.

Then there was a list of 25 penalties which were deducted from the score. Such things as cleaning the carburetor cost 10 points, adjusting bearings cost 20 points each and not having sufficient water to end the two hour test with out replenishing could cost 15 points. One might wonder if the burden of meeting all of the rules may have created some lack of interest on the part of the manufacturers.

Nevertheless, the Winnipeg Plowing Contests established the groundwork upon which the performance of agricultural tractors could be compared. Although there was an interest at the time to set up a national tractor testing program under the USDA, political wrangling delayed any action. When Mr. Willmot Crozier, a farmer and state legislator, needed a source of technical support while developing the Nebraska Tractor Test Law in 1919, he found the most qualified individual in the US in Professor L. W. Chase. His personal involvement in the Winnipeg Plowing Contests allowed him to screen out those tests which were practically impossible to quantify, such as the plowing tests. He went to controlled testing of belt horsepower using an electric dynamometer inside of a building where there was at least some control of the environment. The draft tests were conducted on an earthen, and then a cinder track for tractive uniformity. It was determined within the first season that testing in the snow was something to be avoided.

Professor Chase's 1914 thesis titled "Motor Contests With Results" is a fact filled document, covering, in detail the evolution of the process of performance testing of gasoline, kerosene and steam powered tractors. This brief report is but an introduction to the material he developed and the reader is encouraged to check it out of the Departmental library and enjoy learning something of the early history of tractor development.----W. E. Splinter