The birth of the tractor

By Ian M. Johnston

We of today tend to adopt the somewhat presumptuous philosophy that, because our generation discovered the virtues of the silicon chip, we are more intelligent than those who preceded us. As legions of satellites create celestial traffic jams in our ungodly heavens, we are usually too preoccupied with our own importance to bother reflecting on the past.

Yet the most dramatic developments in the history of farm mechanisation had their genesis in the 19th century. These were far reaching advancements destined to reshape the economies of nations for all time – developments that could only have originated in the great intellects of individuals, who could not have drawn their prophetic speculations from past experiences, as the past belonged to the era of the oxen and the wooden hand plough.

The dawning of the 20th century saw a continuation of the dedicated pursuit of innovative farm mechanisation developments. Numerous primitive embryonic designs, often proving impractical, were re-designed and honed into a state of practicality and efficiency.

Without question, the greatest achievement and benefit to the rapidly expanding agricultural industry, was the emergence of the farm tractor.

Certainly, since the early 1800s, steam power in the form of lumbering, ungainly traction engines, used for hauling wagons and tillage equipment, were polluting the rural countryside. They flagrantly flaunted a rapacious consumption of either coal, fire wood, or indeed straw for their fire box, and an even greater avaricious thirst for pure clean water, required for their boiler – a commodity often necessitating transportation from distant venues by horse drawn water carts. Plus of course, they were responsible for multitudes of terrified horses absconding into the horizon.

One of the very earliest farm tractors was launched in 1901 by The Hart-Parr Co of Charles City, Iowa. (The term 'tractor' was not in general usage until 1907, when it was coined by the firm's marketing executive W. H. Williams and then rapidly adopted by all other farm tractor manufacturers).

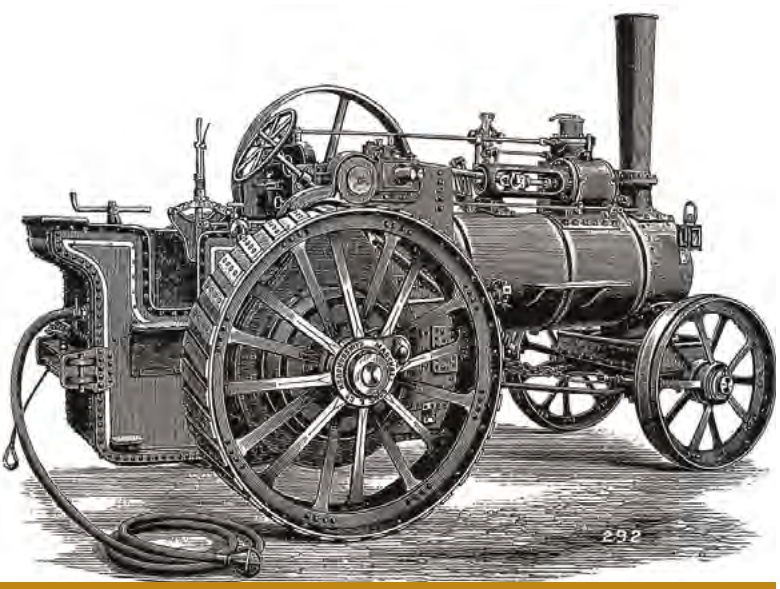
The Hart Parr No. 1 was similar in bulk to the majority of traction engines. But that was the sole similarity. It was powered by an internal combustion petrol fuelled engine which featured a twin cylinder 9 x 13 inch bore and stroke and a 5 foot diameter fly wheel weighing 1000 pounds. The massive engine was only capable of producing a paltry (by today's standards) 17 drawbar hp and 30 belt hp.

In order to promote the emergent range of Hart Parr tractors, and divert the focus of farmers away from traction engines, Williams inserted the following epistle in various agricultural magazines:

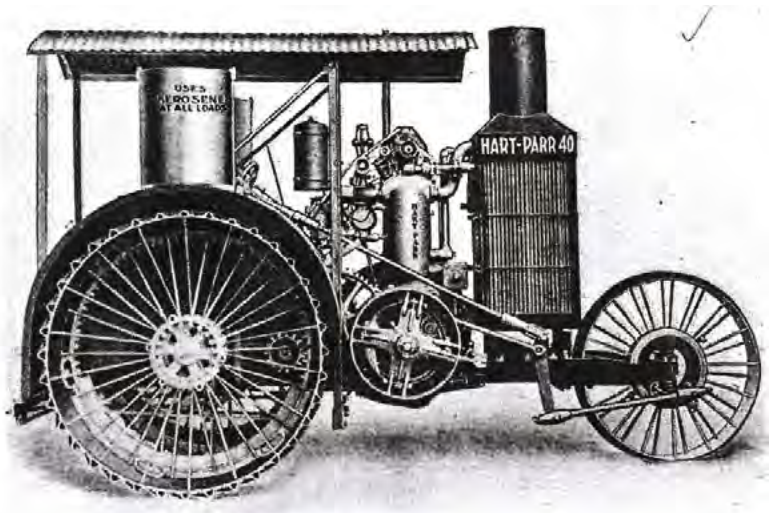
> *Perfect traction control, forwards or backwards with a single lever. No shifting of gears, no water, no steam, no gauges. No grate bars, no coal, wood or straw. No fires, No fireman.*

The majority of early tractors featured either single or twin cylinder petrol fuelled engines. A few included a vessel, adjacent to the exhaust manifold known as a hot box, into which low priced kerosene was directed and once heated would fuel the engine more cheaply than petrol.

Owing to the infancy of design of these internal combustion engines, they often experienced inherent faults which mainly involved carburetion and ignition.



An 1877 Marshall 6 hp traction engine manufactured a Lincoln Shire, England. (IMJ Archives)



This Hart-Parr, built in 1912, featured oil cooling, which enabled a higher cylinder temperature than water, permitting the usage of less expensive lower grade fuels. (IMJ Archives)

This is the sole Wallis Bear survivor and is owned by the Schmidt Family trust in Blufftown, Ohio. The rear wheels stand 7 feet tall. (PHOTO: IMJ)

Structurally the tractors were immensely robust, therefore heavy! Metallurgy was at a stage of being a mere rudimentary science. Accordingly, as obviously design engineers had no computers upon which they could resort to calculating stress loads, they preferred to err on the side of over rather than under strengthening. This of course frequently resulted in an unnecessary increase in weight.

As previously stated, early tractors commonly were powered by large single or twin cylinder engines, but surprisingly, there were a few four and even six cylinder power units of outstanding performance and reliability that heralded the future for tractor engines. Of particular note was the remarkable Wallis Bear.

The Wallis Bear was a product of The Wallis Tractor Company of Cleveland Ohio. In 1902 the company amazed the fledgling mechanised farming world by producing a gargantuan colossus of a tractor aptly named Big Bear. Not only was the tractor big it was also technically brilliant! It is hard to accept that in 1902 there existed a tractor which featured power steering, independent turning brakes, spring loaded clutch, enclosed three-speed transmission, all speed governor, four cylinder engine with 7.5 x 9 inch bore and stroke, and 1480 cubic inch displacement. The Wallis organisation was acquired by the J.I. Case Plow Works in 1919.

On the other side of the Atlantic, an English bicycle manufacturer named Dan Albone, whose small factory was located in the Bedfordshire village of Biggleswade, created history when in 1903 he produced the world's first diminutive tractor, designed to replace a single horse. This was a complete contrast to the ponderous machines being developed in the USA and elsewhere. Albone named his tractor The Ivel, after the name of the stream which meandered through his village.

The Ivel featured two driving rear wheels and a centrally mounted single out front tricycle steering wheel. The engine first utilised was a watercooled horizontally opposed two cylinder 8 hp unit designed by Albone himself. Later models featured a 10 hp similarly configured Astor car engine.

The concept of the petite sized tractor proved popular in Britain, where much of the farm work had been performed utilising a single Suffolk Punch or a pair of Clydesdales. Also export sales flourished as other countries, including Australia, appreciated the versatility of the new compact tractor. The Ivel

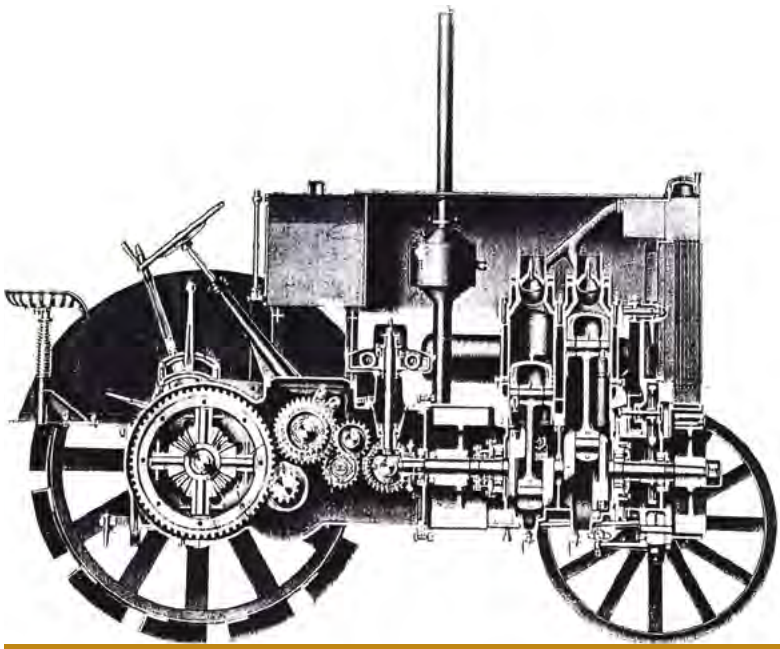
Only a few examples of Ivel tractors remain. This 1903 model was restored by Norm Mackenzie. (PHOTO: IMJ)

was also sold in Germany under the brand name of Hebler.

During the latter part of the 19th century, a number of Scandinavian fishing boats, normally relying on their sails and wind for movement, were being equipped with single cylinder low compression two stroke oil engines, conceived mainly in Sweden. Their simplistic design and reliability rendered them ideal for emergency power for these small boats, which were constantly venturing forth out into the formidable challenges of the North Atlantic.

A number of astute design engineers concluded that these uncomplicated engines would prove ideal for powering tractors.

Accordingly, within the early decades of the 1920s, it was becoming routine to hear the characteristic sounds of single cylinder two stroke crude oil fuelled tractors thumping their way around rural countrysides. Perhaps predictably, the first of these



The Munktells 40 hp type 30, made in Eskilstuna, Sweden, was powered by the legendary Munktells vertical low compression two cylinder two stroke valveless crude oil burning engine, with twin flame-heated ignition bulbs. Compressed air directed to the front cylinder negated the need for hand cranking. (IMJ Archives)

Pictured is a 1917 Holt Caterpillar operating in Nevada. (IMJ Archives)

were Swedish and included such makes as Munktell, Avance and Bofors. (Some of their models were in fact powered by twin cylinder two strokes). Other European manufacturers adopted the trend, including Heinrich Lanz of Mannheim, Landini of Fabbrico, HSCS of Budapest, Ursus of Warsaw, etc.

The Australian firm A.H. McDonald also produced its own design of single cylinder two stroke semi diesel heavy weight tractors, in addition to importing a range of Swedish Avance units. The latter proved less dependable than the thoroughly reliable McDonalds.

In addition, the same single cylinder principal was used by the Victorian firm of Jelbart Bros. of Ballarat – but with a difference! The piston in the Jelbart engine was of the stepped design, requiring the cylinder to have two bore dimensions. Whilst unusual, no combustion or mechanical problems were encountered as a result of the design..

Whilst all the foregoing development of wheeled tractors was taking place and thus enhancing the future of mechanised farming, track laying tractors were also making an appearance.

A 1917 Jelbart, made in Ballarat. Note the horizontal stepped cylinder. Owned by Tony Pailthorpe of Kukerin. (PHOTO: IMJ)

Although Great Britain is usually credited as being the birth place of the crawler tractor, undoubtedly its advancement and maturity occurred in the USA. In the year 1890, Californian Daniel Best built his first steam powered tracklayer tractor. In the same year Benjamin Holt also designed and built a similar steam powered crawler. The steam engines were gradually replaced by gasoline and oil internal combustion power units as the technology advanced. But it was not until 1925 that the two organisations combined to form The Caterpillar Tractor Company.

It is interesting to contemplate that the ancestry of today's miraculous high- technology computer designed tractors, extends back to the great perceptions and intellects of individuals whose only resource was their imagination.

IAN'S MYSTERY TRACTOR QUIZ

Question: Can you identify this very rare American tractor?

Degree of difficulty: Maybe you should just go and have a cup of tea!

Clue: I featured this tractor in my tractor quiz a few months ago.

Answer: See page 72.