



This diesel powered 790 bagger combine was made in Scotland under the Massey-Harris and Massey Ferguson badges

TRACTORS AT THE FORE IN

GOLDEN AGE OF POWER

The mid-1940s was the start of a golden age for farm wealth and mechanisation, there was above average rainfall in most parts and farmers were paid “a pound for a pound of wool.” Farmers invested heavily in tractors and machinery to boost output, and makers were about to be run off their feet

One of the biggest farm mechanisation growth areas was in combine harvester sales as more grain growers switched from binders to reduce their labour costs. Demand was also helped by the launch of self-propelled harvesters which were rapidly replacing the older tractor-powered combines with their more limited capacity, and there was also a trend from bagger models to labour-saving tanker combines.

A combined effort by Hugh Victor McKay's company and hands-on inventor, Headlie Taylor saw the release of the Sunshine Auto Header in 1924, it was the first Australian made

production line SP Header. This centre fed combine could master a 3.66m (12ft) cut and had power to spare with a 18.7kW (25hp) Fordson engine.

In 1930 the H.V. McKay Company was granted local distribution of Massey-Harris machinery, but M-H purchased a slice of H.V. McKay and by 1932 it was renamed H.V. McKay Massey Harris. Local Auto Header production ceased in 1947, and it would not resume again until 1956 with the locally designed Massey Ferguson SP 585.

Massey-Harris went on to introduce self-propelled combines to the world, and through the 1940s and 1950s, they were the

top selling combine brand world-wide.

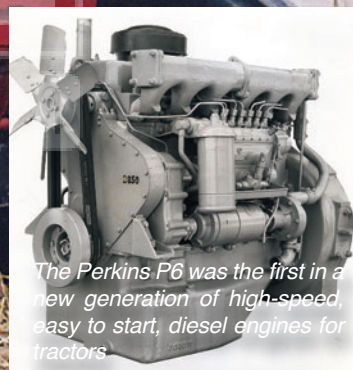
The Massey-Harris harvester sales success was largely due to the skill of Tom Carroll, an Australian engineer who joined M-H in 1917 as a combine specialist and played a leading role in maintaining the company's world leadership in harvesting technology until he retired in 1961.

Major competitors for Massey-Harris in the combine market throughout the 1940s and 1950s included International Harvester, they had self-propelled models available from 1942, while John Deere's success in the self-propelled sector began with the launch of their 55

model in 1946, considered to be one of the most important models in combine history.

European makers made a slower start in self-propelled combine development, partly because their smaller average farm size, where lower-priced trailed harvesters were popular, and also because their local combine market was dominated by machines from the Massey-Harris combine factories in France, Germany and Scotland.

Claas announced their first self-propelled harvester, the SP55, in 1953 and later expanded to become easily the biggest combine maker in Europe. The Clayton range in Belgium included self-propelled models



The Perkins P6 was the first in a new generation of high-speed, easy to start, diesel engines for tractors.

A Perkins P6 diesel engine was standard equipment on the British built Massey-Harris 744PD from 1948

from 1955 in a factory that now builds New Holland combines.

Tractors were also in demand and sales expanded rapidly after the end of World War II in 1945. Their popularity was helped by technical developments that promised to raise productivity, and one of the main features fuelling that demand was a new generation of diesel engines.

While some firms in Europe and the United States had already offered diesel powered tractors during the 1920s and 1930s, sales were usually disappointing. This was partly because the early engines were difficult to start and expensive, and also because few farmers were aware of the diesel performance benefits such as improved pulling power, better reliability and lower fuel consumption.

The breakthrough for diesel power came in the mid 1940s and early 1950s when the first of the new generation tractor engines arrived.

As well as all the diesel benefits, they were also easier to start using an electric motor in place of the petrol engine needed to start many of the older diesels, bigger sales volumes made them less expensive and they were also faster running to provide a smoother performance and better torque characteristics.

Demand for diesel power in tractors and combine harvesters grew rapidly, encouraging

many European and American equipment companies to offer this type of engine, some developing their own power units and others buying in engines from specialists such as Perkins, which became the world's biggest manufacturer of diesel engines for farming.

Four-wheel drive was another productivity development that had made little headway before World War II, but was welcomed from the late 1940s onwards. Depending on ground conditions, pushing engine power through four wheels instead of two increases pulling power by 15 per cent or more and the extra productivity was a big draw card to many farmers.

At first, most of the 4WD development came from European makers, with Deutz in Germany, SAME and Fiat in Italy and the Steyr factory in Austria designing four-wheel drive tractors with smaller diameter front wheels.

While specialist companies here and elsewhere chose large diameter wheels front and rear. Using equal diameter front and rear wheels, such as the system developed by Baldwin, Phillips Acremaster, County, Doe and Muir Hill, is more efficient than having smaller front wheels, but the disadvantage is a big turning circle.

One of the obvious ways to improve productivity during the period after World War II was to fit a better transmission.

Many 1940s production tractors were still equipped with a basic three or four-speed gearbox which would have been familiar to a tractor operator 30 years earlier.

Problems with this type of transmission included a very

limited choice of forward speeds that did not match some types of implements, and the lack of synchromesh on at least some of the ratios made gear shifting difficult.

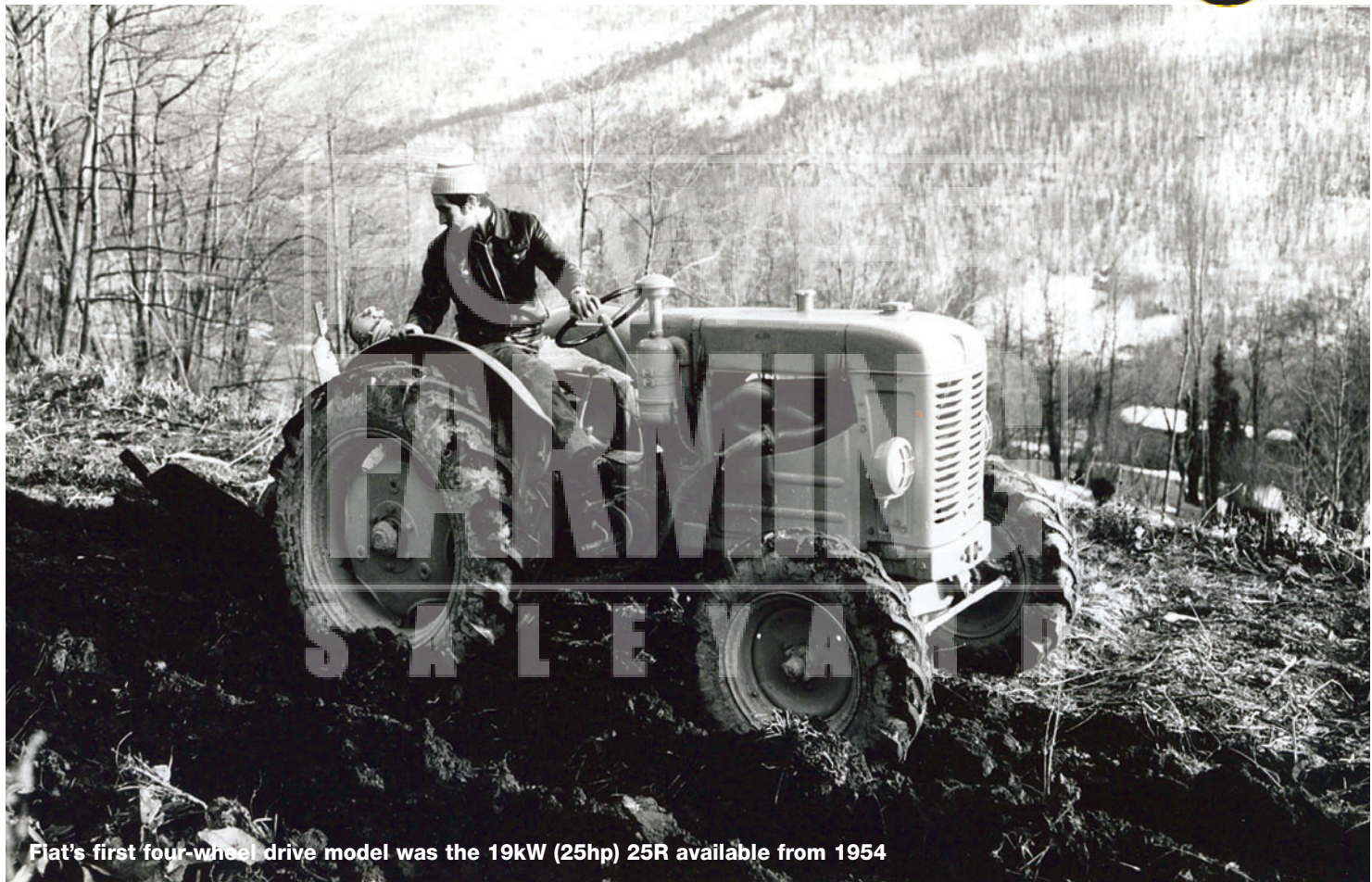
In the search for a different type of transmission it was



HV McKay's Sunshine Auto Header released in 1924 was the first Australian made production line self-propelled combine



John Deere launched their model 55 self-propelled Combine Harvester in 1946



Flat's first four-wheel drive model was the 19kW (25hp) 25R available from 1954

Britain's National Institute of Agricultural Engineering (NIAE) that took the lead.

In the early 1950s they started work on a project to build a tractor with a hydrostatic transmission. It was based on a Fordson Major, the mechanical transmission was replaced by a hydro drive system, and the tractor was demonstrated for the first time in 1954.

Hydrostatic transmissions offer impressive benefits. Instead of driving a set of gears, the engine powers a pump that sends pressurised oil through a pipe to motors that drive the wheels, and after passing through the motors the oil circulates back to the pump again.

Instead of operating a clutch pedal and changing gears, the hydro driver simply operates a lever or foot pedal that gives infinitely variable speed adjustment up to the maximum without altering the engine speed.

The precise speed control makes it easy to find exactly the right travel speed, clutch wear is eliminated, there are no gear changes to cause breaks in the power delivery and with correct maintenance hydrostatic transmissions have a reputation for long-term reliability.

There was enormous interest in the NIAE's experimental tractor and predictions that this was the transmission for the future. Some makers began

their own hydrostatic tractor development programmes.

Massey-Ferguson built two experimental prototypes while International Harvester chose a hydro drive for an experimental tractor completed in 1961 and offered a hydro drive combine in 1964.

Some of the enthusiasm for putting fluid drive systems in tractors faded as the test programmes identified their one serious flaw – power losses are about 15 per cent higher than from a gearbox transmission, and that means less productivity and higher costs for jobs that rely on drawbar pull.

International Harvester was one of the few companies that built hydrostatic tractors commercially with production in the United States and Britain until 1985, and the Versatile company in Canada offered a series of special loader tractors with hydro drive until the mid-1990s. In spite of limited success in tractors, hydrostatic drives remain popular for equipment such as telescopic loaders and combine harvesters.

The Ferguson System success story started in the 1930s when David Brown and, later, Henry Ford helped to establish Harry Ferguson's three-point linkage with hydraulic control, and the demand continued to grow after the war. More farmers were realising the benefits of the Ferguson System, this encouraged machinery manufacturers to

offer more implements to fit the three-point linkage.

In 1946 Harry Ferguson

started selling his famous TE-20 series tractors, which were made for him at the



Linking two tractors together produced the high horsepower Doe Triple-D with four-wheel drive



The hydrostatic transmission on this experimental Fordson attracted worldwide interest



International Harvester was the only major manufacturer to offer a range of hydrostatic drive tractors

Standard car company factory in Britain, and he later built the basically similar TO series tractors in America.

Other companies produced tractors with a modified version of the linkage until the Ferguson System patents had expired and by the late 1950s almost all the leading wheeled tractor manufacturers included a three-point linkage as standard equipment or as an extra cost option.

Harry Ferguson's tractor operations in Britain and the United States are examples of the huge structural changes that resulted from the rapid growth in power farming.

One of the developments was that all the leading American tractor companies plus the Canadian based Massey-Harris decided to establish manufacturing or assembly plants in Europe.

John Deere chose Germany, but others set up subsidiaries in Britain where industry had suffered less wartime damage than on the continent. Ford was already Britain's biggest tractor maker, but the new arrivals included Allis-Chalmers, International Harvester and Minneapolis-Moline plus Massey-Harris from Canada.

Britain also produced the Platypus crawler tractors, built by a company formed by our local farm machinery maker, AC (Cliff) Howard of Howard Rotavator fame, as our local tractor industry was undergoing major changes during the 1940s and 1950s.



The success of the Ferguson System linkage, shown here on a Ferguson TE-20 tractor, forced other companies to offer three-point linkages

While production of Howard's DH 22 tractor was still in Australia, the company was also offering the DH 22 to British farmers, production ended in the late 1960s after a run lasting almost 30 years.

Tractor technology was improving at a faster pace overseas than locally, and imports built on vast production lines for world-wide supply were beginning to gain favour here.

The McDonald Imperial Oil Tractor, credited with the first Australian built oil-burner in 1908, had achieved peak sales of about 400 tractors a year in the 1930s, but was only selling in small numbers when production ended in 1955.

Another casualty was the KL Bulldog, built here, but based on the German Lanz Bulldog



Locally built Howard DH22 tractor with its rotary cultivator attachment enjoyed a 30-year production run until about 1960



Nuffield was one of the new companies entering the tractor industry in the late 1940s

with a semi-diesel engine. The Australian Bulldog was available for just 10 years from 1949, with total production estimated at almost 1000 tractors.

International Harvester filled some of the void, when it released its first Australian built tractor, the AW-6, in 1949 with 25kW (34hp) available at the drawbar. By 1953, 10,000 tractors were on local farms and by 1955 there were eleven models available in the range.

Production expanded to include the Farmall AM-7 and McCormick International A414 with sales booming and the model range expanding until the ultimate demise of IH and

its merger with Case to form Case IH in 1984.

Another shining light for the local tractor industry was the success of the Chamberlain tractor project. The company, started by the Chamberlain family, expanded to become the biggest tractor maker in Australia.

It all started in December 1945 when the first prototype of a locally designed and built tractor, the 40-K was rolled out, it was to prove itself equal to the best coming out of the US, and by 1951 it was in mass production.

The design had in fact been roughed-out in the 1930s,

when AW (Bert) Chamberlain and his sons AH (Bob) and HF (Bill) formulated plans for a heavy-duty wheeled tractor to meet the needs of Australian wheat farmers.

The 40-K had a rugged horizontally opposed two-cylinder four-stroke engine that ran on kerosene fuel with an octane rating of 51. It had a maximum power output of 31.9kW (42.7hp) at the belt and 30.6kW (41hp) at the drawbar with a pull of 2405kg (5300lb) at 4.6kph (2.86mph).

It was to be the first of a proud line of Chamberlain tractors that was to continue until 1986, when the company,

by then named Chamberlain John Deere, elected to terminate production and the last home-built models were replaced by imported John Deere tractors. □

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Chamberlain's 40-K ran off a rugged horizontally-opposed two-cylinder four-stroke engine with a bore of 6.125in and stroke of 6.25in (156mm x 159mm), on kerosene fuel with an octane rating of 51

In the next 120 year series



In our next installment. By the early 1970s, farmers had all the power they could muster with 45kW (60hp) tractors common-place. There was just one drawback, as the power bulge grew, so did accidental tractor deaths on farms – at its peak – more than 100 operators perished each year. Something had to be done, a test scheme for roll-over protection structures (ROPS) began in 1970. Safety cabs saved lives and with their arrival came terms such as operator comfort and convenience, soon followed by cab suspension and the first simple electronic systems began to emerge. □