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Milestones in agricultural engineering

Here, agricultural engineering innovations which in their time changed the farm industry, or at least were responsible for considerable advancement, are presented as they have been since 1987. If one traces mechanisation milestones on the land back 25, 50, 75 years and longer, then one is amazed to find that many ideas and solutions are really not so new as they appear.

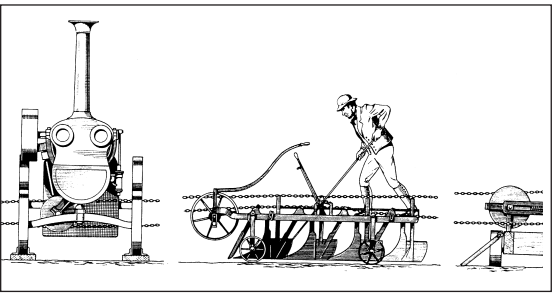

Fig. 1: Lord Willoughby's steam plough, 1851

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After the child has fallen in the stream the cry "How could this have happened?" comes from every corner. Those who have never really thought about the chicken and egg effect react most excitedly. Not to worry, though! The excitement generally dies down as quickly as it boiled up. The reflex action is part of "daily politics" and there's never any shortage of "short-term experts". The historical dimension is something different. Occurrences here are far from daily. They represent real effort but are thoroughly unspectacular with notably little excitement involved. History knows the conditions required for technical advances, knows that these are characterised by forward, but also reverse, steps. "Where there's a lot of light there are also stronger shadows" was what Goethe had his Götz von Berlichingen say – and this is exactly the point. Without shadows the performance explosion in field and barn could not have occurred, and cannot continue. Certainly, the price is often high. But the result in every case is well worth it. Never before has life expectancy been so long. Never before can people grow old in such dignity and prosperity as in the beginning of the 21st century. The pioneers of agricultural engineering had, and have, a substantial share in these achievements.

1801

This applies in great measure to Franz Carl Achard. He was teacher at the "Bergakadamie" in Charlottenburg before being promoted to director of the physics class, Berlin Academy of Sciences. He was interested in sugar beet which was meant to make the country independent of colonial sugar. On the Lower Silesian Cunnern estate he began exactly 200 years ago with the creation of the world's first-ever beet sugar factory which experienced its first campaign one year later.

1826

Also a pioneer in the truest sense of the word 175 years ago was Munich mechanic Georg Semler. Exactly on October 5, 1826, shortly before the Munich Oktoberfest, he let farmers know that he was immediately beginning the production of Brabant ploughs, potato elevators, scarifiers, extirpators, harrows, English and Swiss drills and feed cutters too. Additionally, Semler – who worked within the "General Committee of Agricultural Societies in Bavaria" – announced future " Private instruction in practical mechanics". Theology student Patrick Bell began his agricultural engineering career in a quieter manner. In Scottish St. Andrews he observed a gardener hedge cutting with large shears. From that moment onwards Bell couldn't get out of his head the thought of cutting cereals with an instrument based on a scissors action. The Gaulish mower-wagon as described by the Roman agricultural author Palladius tantalised him and encouraged him to construct a cereal mowing machine – the development of which, however, required another two years.

1851

The farm engineering introduction without equal was the first world exhibition which took place exactly 150 years ago in London. The organisers scored a success right from the start by securing as location the famed Crystal Palace. But what was presented in the halls surpassed every expectation. In August 1851 the highly-respected London Times noted: "The McCormick mowing machine alone was more worth than the cost of the entire world exhibition." And McCormick's mowing machine was certainly not alone there. Obed Hussey from Baltimore competed with demonstrations of his corn reaper on the fields of the ultra-rich English industrialist J. J. Mecchi and showed the gasping Europeans how well one had cereal harvesting technically in-hand over on the other side of the Atlantic. So it was no surprise that the reaper started out from London and conquered the world.

Also earning great public acclaim was the two-machine steam plough set exhibited by Lord Willoughby d'Eresby. Here, for the first time, a two furrow plough with depth control was pulled by chain over the field – a system that later earned legendary fame in the form improved by John Fowler and Max Eyth.

1876

125 years ago, decisive impulses for farm engineering advances came out of Cologne on the right bank of the Rhine. Nikolaus August Otto, Wilhelm Maybach and Gottlieb Daimler worked together at that time in the "Gasmotorenfabrik Deutz" and presented beginning of May the first four stroke engine in history. At 180 min^{-1} the engine, protected under DRP basic patent number 532 and still fired by direct flame ignition, produced 3 PS

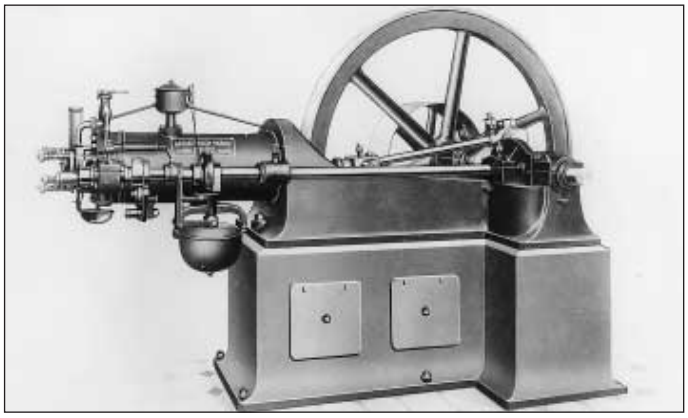

Fig. 2: First commercial four stroke gas engine from Deutz 1876

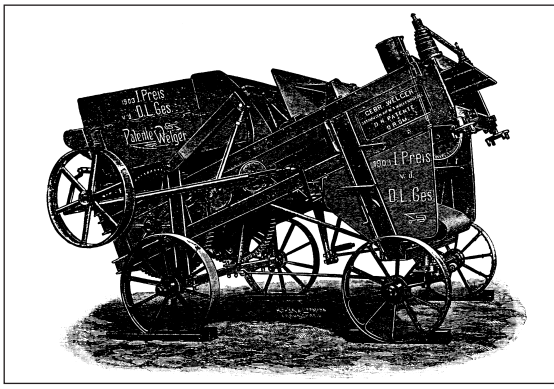

Fig. 3: First self-binding broad straw baler from Welger Bros. 1901

and opened for all visionaries of the mechanised landscape tremendous perspectives. Less euphoria, on the other hand, came from the producers and processors of milk. A terrible foot and mouth epidemic had everyone anxious. The heating of milk came at just the right time. Several examples of pasteurising, or sterilising, equipment made their debut at the same time in 1876. Wilhelm Lefeldt, Helmstadt discovered the importance of centrifugal power for milk separation and henceforth fitted inside the centrifugal a cylindrical drum instead of the small bucket that had been used before.

1901

A 100 year jubilee is always something special! The "Association of German Agricultural Machinery and Implement Dealers" would have been able to celebrate this today just as much as Seniorwerk Albert Busse, Wurzen, famous through its hoeing machine, or the Motorenfabrik Heinrich Kämper, Berlin. For Eicher, too, the Champagne could have been put ready on ice. After all, Josef Eicher opened a repair workshop in Forstern in 1901 which his sons later built up into one of Germany's greatest tractor factories. The Welger brothers from Wolfenbüttel also steered towards another agri-technological milestone. Their self-binding straw baler was patented on September 1 and at the same time put right to work on a large estate near Halberstadt.

1926

An outstanding date was January 5, 1926. From the "Association of Manufacturers of Agricultural Machines and Implements" emerged the German Agricultural Machinery Industry Association (LMV) which has consistently represented the interests of the farm machinery industry. Projects such as the creation of a beet harvesting committee in Halle/Saale, the organisation of competitions, or the presentation of electro-farms all brought great success. At the same time, construction and development work was not forgotten. Thus Lanz replaced the steam Bulldog by the radiator Bulldog which proved longer-lived than its predecessor and has become a legend. Professor Derlitzki, in the meantime, presented the Pommritzer beet lifting plough which heaved the topped beet right out of the ground, and J. F. Klausing from Rabber near Osnabrück cooperated with tenant farmer Fleuster in the realisation of large-area beet lifting technology reminiscent of the sort of scale applied nowadays. Finally IHC presented for the first time in Germany a tractor and binder team linked with a jointed shaft. And for those who wanted still more innovations, there was Bad Cannstatt to look over. There, 75 years ago, the tinkerer Andreas Stihl was busy on the development of motor chain saws which he brought to market maturity in just a few years.

1951

What an open mind was brought to the work of agricultural engineers 50 years ago! Among lots of examples, the new thinking included the tool carrier Alldog created by Professor Knolle for Lanz in Mannheim. Shown in Hamburg for the first time, the concept captured the imagination as few other machines had done before. At once the term "tool carrier" became fixed in the imagination – even when the Alldog didn't deliver in practice what it promised. Without a doubt, however, the wheel rake hay turner built by H. Niemeyer, Riesenbeck, was there to stay. This idea revolutionised forage harvesting in a sustainable way and it was no wonder that within five years 180,000 "Heumas" found their way to the farmers. Martin Rausch, Frechen, presented the pto-driven manure spreader "Spitzenreiter" which could chop and broadcast manure over large areas. A new way was also taken by Dipl.-Ing. Poensgen. Based on a drum mower produced by the Segler firm in Quakenbrück he constructed a field forage harvester with collecting drum. The firm Fahr from Gottmadingen recognised the importance of this machine and on its concept based the first serially-built forage harvester in Germany. Breaking new land was also Mercedes-Benz in Gaggenau and Jan Freudendahl in Danish Sonderborg. Mercedes took over the production of the Unimog from the Böhringer brothers in Göppingen, and developed it into an absolute trade mark. Jan Freudendahl, on the other hand, risked the entry into the agricultural machinery branch and expanded his enterprise by specialising in high-performance harvest machines.

1976

In comparison, things were a little quieter in the agricultural engineering world of 25 years ago. Certainly, at the 54th DLG exhibition in Munich there was the introduction of the Schlüter ProfiTrac 3500 TVL, a hit with its 228 kW/320 PS. For most of the still-existing 889000 farms in Germany such a giant was out of the question, however. The average engine power of the 60150 new-registered tractors lay by 43 kW and, abroad as well as at home, mechanised giants were the exception. Looking back, the technological niveau in 1976 must not be overestimated. After all, hand milking was still the norm in every fifth dairy farm – and there were more than 100,000 of them. However, technology advantages in agriculture continued without pause. Claas and Welger presented new types of round balers, Aebi brought out the tool carrier TT-77 for work on slopes and Fortschritt, Neustadt, surprised all combine experts with the model E 516. The largest combine in the world at that time came from the DDR, impressing with its threshing cylinder and cutterhead and designed for the fitting of mechanical feelers.

Fig. 4: Heuma broad turner from Niemeyer 1951