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Milestones in the history of agricultural engineering

Following a tradition which began in 1987, innovations in agricultural engineering which changed agriculture at their time or at least provided significant progress in this field are presented here. If one traces back the mechanization of agriculture along the milestones of agricultural engineering 25, 50, 75 years, and longer, one will notice with astonishment that many ideas and solution proposals are not as new as they seem.

Keywords

Mechanisation of agriculture, important inventions and events

Abstract

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Whether an invention will change the world or at least prove a substantial aid for mankind is something no one likes to risk an opinion on in advance. Some inventions caused considerable sensation on announcement but rather quickly swam out of the public focus. On the other hand, there were those that earned laughter at first and then went on to prove exceedingly successful. Neither is welcome to the planners and their requirements for steady reliable progress. But this is not what advances and the future are about. The situation that innovators welcome always includes risk. They need the adventure. After all, only those that seek out new directions discover winning ideas.

1710

300 years ago James Meikle, father of Andrew Meikle the inventor of the Scottish threshing machine, brought home a remarkable construction from a trip to the Netherlands. Called a "Duyvel" by the Dutch, this was a wooden box within which rotors could be turned via outside crank thus creating a wind stream. A certain amount of noise was caused by the contraption, causing fear amongst children and those with simpler minds, meaning the Dutch description for "devil" wasn't so far off the mark. But this "devil" had a good side. If grain was thrown in the box the wind separated corn from chaff and dust. This wind-cleaner, also called cleaning mill, represented a great step forward in that from this simple wooden box there developed, step-by-step, efficient grain cleaners with a variety of sieves and grading equipment.

1760

Going back 250 years takes us to a time when ways of threshing grain occupied inventors interested in mechanisation on the land. No wonder: the common flail threshing method up to that time was among the most arduous jobs in farming. With this as background, Nils Cissler from Stockholm recommended to the Swedish Academy the application of threshing trailers pulled by draught animals over the spread out crops instead of flail-swinging labourers. Not that this suggestion was really new – even the Romans had applied the threshing trailer idea with sledges – a method used even today in many parts of the world.

1785

William Winlaw from Haryleborn in England was already a step further than this 225 years ago. He constructed a stationary axial thresher which looked something like a coffee mill and which was called the "meat grinder". In fact it was very effective at rubbing grain out of the ears between its revolving cylinders – so effective that damage to the grain was a problem. This made the corn threshed by Winlaw unsuitable for seed and his machine wasn't able to establish itself. New ways were also followed by Edward Fullwood from Clarkenwell near London. He made his money from the import of food colouring materials from Jamaica and invested in the company Fullwood & Bland which in the 20th century made its name through pioneering improvements in milking technology.

1810

200 years ago H. P. Lee from Maidenhead-Thicket had his hour of glory. His, for these times, fast-action threshing machine was

the first able to work without feed rollers. Instead, the threshing drum action alone pulled-in the crop. Four beater bars were attached to the drum and the gap between concave and drum could also be adjusted according to the crop being threshed. For the renowned Society for the Encouragement of Arts, Manufacture and Commerce in London this was worth a gold medal. Great interest was also raised by Robert Salmon from Woburn. He equipped his drill machine with shares which had "long, sharp beaks upwardly curved" so that the ground could be cleanly slit for seed placement, leaving a smooth soil surface without ridges.

1835

Pastor Johann Anton Hansen founded Prussia's first arable farming school in Lisdorf near Saarlouis. At the same time, an agricultural association was started in Eisleben with the aim of "exchanging ideas and experiences in agriculture and publicising farming inventions". In Hanover, Georg Egestorff founded an engineering society which, under the name Hanomag, was to establish important steps in tractor manufacture from 1912 onwards.

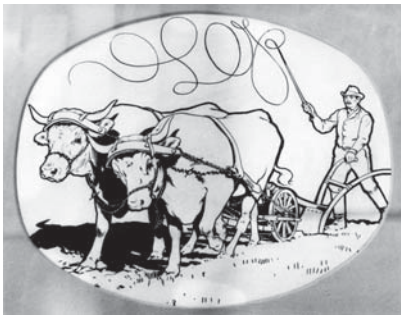
1860

Heinrich Lanz, Mannheim, sold a steam-driven threshing machine for the first time. This was made by the English company Clayton, Shuttleworth & Cie., the products of which were reckoned among the best available in those days. Shortly afterwards, Lanz established a workshop in a small garden shed with two workers for repairing and maintaining the machines he sold. From these beginnings developed the largest agricultural machinery company in Europe. L. O. Colvin from Philadelphia constructed a milking machine featuring a hand-driven vacuum pump. The result wasn't entirely satisfactory. But compared with the "milking tubes" being tried in other regions the idea represented substantial progress. Among the agricultural engineering companies founded 150 years ago were the pump manufacturer Gotthard Allweiler, Radolfzell, Hermann Amos, Heilbronn, E. C. Flader, Jöhstadt and Bernard van Lengerich in Emsbüren. All of these supplied important chapters in the history of agricultural engineering with their inventions.

1885

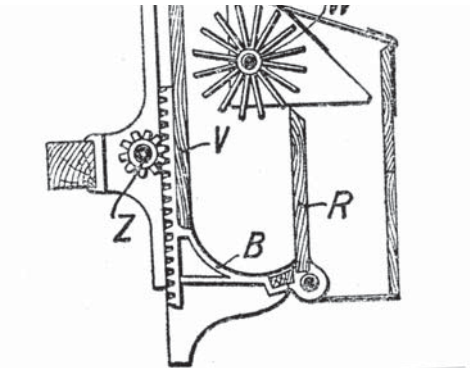
125 years ago the German Agricultural Society (DLG) was founded in Berlin. With its product tests and exhibitions the DLG remains to the present day an important motor for agricultural progress (**figure 1**) More modest, but nonetheless not to be undervalued, is the innovation of the salesman Franz Schloer from Barth. His artificial fertiliser spreader featured a box for the material in which was fitted a shaft with lateral pegs for even spreading of fertiliser (which in those days tended to form clumps) (**figure 2**). Among others, the Pommersche Eisengießerei, Stralsund, and Siedersleben, Bernburg produced Schloer's spreader.

Fig. 1



Since the founding of the DLG the organisation's motif has always been the whip-wielding farmer with his team of draught cattle. This was personally created in 1885 by DLG founder Max Eyth, the whip lash so drawn that it forms the letters "DLG"

Fig. 2



With the 1885 Schloer fertiliser spreader, the hoppers were moved to the spreading mechanism via rack and pinion gearing

1910

100 years ago there appeared as an anniversary present from the DLG to mark its 25th Jubilee a book "The Development of Agricultural Machinery in Germany" by Geheimrat Gustav Fischer (**figure 3**). Well known agricultural engineers contributed and the result was an outstanding overview of the niveau farm mechanisation had by then achieved. Georg Osterrieder from Leutkirch in the Allgäu built mobile elevators. These mechanically foldable implements revolutionised technology for moving material from one level to another in that they made "heavy burdens lighter". In North America the John Deere Plow Works, Moline stepped from being mainly plough-makers into the harvesting machine business. Seven binders constructed as prototypes opened the way into a new and promising market.

1935

A beet harvesting process developed in the Pommritz Agricultural Research Institute expedited the beet harvest and reduced associated costs. It was called the "Pommritzen" and its use meant that the beet tops were cut off while the roots were still in the ground (**figure 4**). Only then were the roots ploughed free, loaded up and driven off – a resounding success. Beet har-

Fig. 3

Die Entwicklung
des
landwirtschaftlichen Maschinenwesens
in Deutschland.

Festschrift
zum 25jährigen Bestehen der
Deutschen Landwirtschafts-Gesellschaft.

Bearbeitet von

Prof. Dr. G. Fischer-Berlin, Ökonomierat Dr. Albert-Münchenhof,
Ingenieur O. Kühne-Berlin, Ingenieur R. Meyer-Berlin,
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Berlin SW 11
Deutsche Landwirtschafts-Gesellschaft
1910.

In 1910 the DLG occasioned the production of a massive 436-page Festschrift on development of agricultural mechanisation in Germany

vesting costs were halved. Subsequently, the "Pommritzen" led to the development of a two-row topper and special beet plough about which RKTL reported in a new series of agricultural engineering papers. The aim was to make the individual publications understandable for all. Other articles informed over dung middens, slurry pits and plant protection. Also publicised were first experiences of supplying electrical current in the villages of Saulwitz, Fellbach and Walkersbach. The experience promised a real future for electrification of rural areas. In Stuttgart-Bad Cannstatt Alfred Kärcher started a company that moved four years later to Winnenden and now, as cleaning equipment specialist, is represented with its machines the world over.

1960

In Mannheim the last from 219 253 Bulldogs come off the assembly lines. At exactly the same time the venerable Heinrich Lanz AG assumes the name John Deere-Lanz AG. The motto reads: "New century – new name – new logo". Simultaneously the number of tractors being used in West Germany overtake draught horses for the first time. Full motorisation is being achieved leading in Großburgwedel near Hanover to the establishment of the first independent professionally-managed machinery ring. The sensation, however, is reserved for farmer Ernst Weichel from Heiningen at the foot of the Swabian Alb. At the 46th DLG exhibition in Cologne he presents a self-loading forage trailer, the "Hamster". With this, Weichel establishes completely new standards for forage harvesting (**figure 5**). The skilful amalgamation within a single trailer of pick-up reel, loading arms and chain-and-bar floor scraper enables single-handed harvesting of grass and hay for the first time.

1985

The individual German farmer is now able to supply 62 town-dwellers with food. With that, he's in a better position than his professional colleagues in the EU who on average feed 47. But looking at the competition worldwide, it's the US farmer that sets the tone by feeding 79 people on average – and it's obvious to all that this won't be the final figure. Supporting this development is not least a re-shuffling on the US farm equipment market. Within a single year IH and Case merge forming Case-International: Ford assumes the majority in Sperry-New Holland. Finally, KHD buys a part of Allis Chalmers. Everything appears to be in movement and in this respect a new agricultural machinery exhibition fits in well. DLG and LAV (German Farm Implement and Tractor Association) invite to Frankfurt/Main end of November for the first Agritechnica and hope for good support. The organisers are not disappointed. Exhibitors and visitors exceed expectations. Above all, the innovations in farm equipment prove to be a magnet – innovations such as the Rol-

Fig. 4

The "Pommritzen" developed in 1935 was even more effective through using two-row toppers for the beet tops

Fig. 5

In 1960 Ernst Weichel presented the prototype of his "Hamster" self-loading trailer at the DLG exhibition in Cologne

lant Rapid round baler from Claas, the first round baler in the world that doesn't need to stop for the binding action (**figure 6**). Fendt surprises everyone with its Farmer 306 LSA tractor featuring a Fendt-MWM developed 4-cylinder alcohol engine with dual-fuel system. Ethanol as fuel is claimed as an option for the future and this also applies to the Bosch-developed electronic wheelslip regulator for tractors. This offers both fuel saving and soil structure protection and, with that, once again emphasises the technical potential lying in tractors and farm implements.

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Fig. 6

A world premier was celebrated by Claas in 1985 with its non-stop Rollant Rapid round baler. This could bind the bales without having to stop in the process