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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.

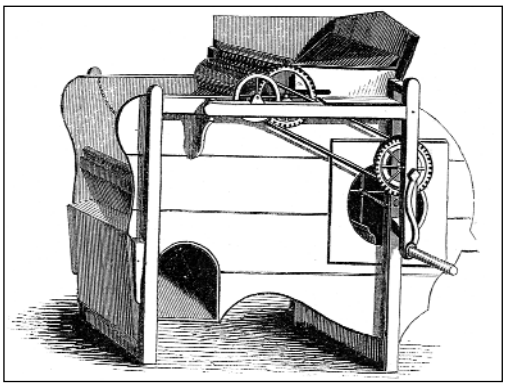

Fig. 1: The Count of Hohenthal cleans grain with a cleaning mill at his Dölkau estate for the first time in 1783

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Keywords

Mechanization of agriculture, important inventions and events

In many cases, however, the time span from the idea to implementation in large numbers has become shorter. More and more often, the modern media allow inventions to become reality quasi over night. On the other hand, technology which was celebrated as an innovation a short time ago also quickly disappears from the market again. Therefore, one frequently asked question is which innovations are going to last. This question shows the restlessness which is characteristic of the 21st century.

1733

Jethro Tull did not know this rush. The system whose design he deemed appropriate and which consisted of drilling in rows and hoeing between them occupied him for decades. He added one element to another, and at the end he developed a tillage technique which lasted. In this process, the year 1733 was an important date. 275 years ago, Tull published his epoch-making work "The Horse Hoeing Husbandry or an Essay on the Principles of Tillage and Vegetation". In this publication, he extensively described the procedure and technique of tillage, sowing, and mechanical weed control. His work was sustainable in the best sense even if this word came to no-ones mind at that time.

1783

The work of Saxonian nobleman Graf von Hohenthal also lasted beyond his time. At his estate in Dölkau in Saxony-Anhalt, he is reported to have set up the first polishing mill, a grain cleaning machine which travellers to east Asia had brought from China to Europe. Termed air sifter, it was widely used and found on almost all farms in the middle of the 20th century.

1808

200 years ago, Robert Ransome revolutionized plough construction. Based on the insight that the constructional parts of the plough are worn to a different degree, he designed an implement with exchangeable parts, which was largely made of iron. The handles as well as the share, the coulter, and the mouldboard were now able to be replaced. The development towards the agricultural implement with a spare part list had begun.

1833

One tends to forget that the current arable soil is the result of tillage by generations of farmers. Under this aspect, irrigation or drainage play an important role. 175 years ago, Scotsmen Parkes and Smith noticed this connection. One of them developed a complex, five feet deep drainage system, while the other one first mentioned clay pipes as particularly suitable for drainage. In North America, the great moment of former seafarer Obed Hussey came in 1833. His ideas about the mechanization of the grain harvest were as bold as his appearance after he had lost one eye and one arm. On 2nd July 1833, he presented a mowing machine, whose cutter consisted of an upper cutter bar equipped with triangular blades and a lower bar, which featured iron fingers. With the blades which oscillated between the fingers, Hussey created a future-oriented mowing system. He became the main competitor of Cyrus Hall McCormick, with whom he fought real "mowing machine wars" at exhibitions and demonstrations.

1858

150 years ago, creative heads felt challenged by harvesting technology. The brothers Charles and William Marsh from Illinois designed the first functioning mowing machine with manual binding. Its appearance was similar to that of the reaper-binder. However, the difference was that binders stood at the place where later the knotter was installed and had to bind sheaves quickly one after the other. John D. Appleby from Whitewater (Wisconsin) was not satisfied with this system. Just 18 years old, he began with attempts to develop a mechanical knotter, which were successful a decade later. In Germany, tillage was the focus of interest in agricultural engineering at that time. Richard Schwartz from Granow designed a self-

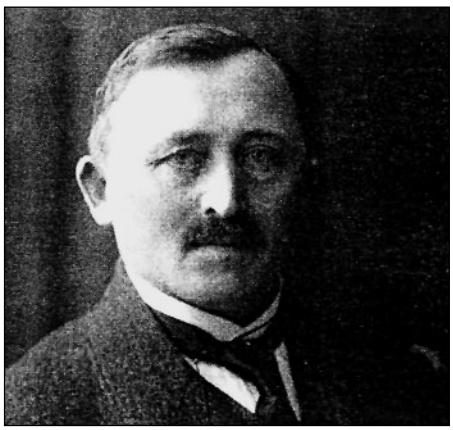

Fig. 2: Heinrich Dreyer (1863 - 1939) started manufacturing grain cleaners in 1883 and became the founder of Amazone Company through that

guided iron cart plough, which became a successful model of the future plough factory Ed. Schwartz & Sohn, Berlinchen.

1883

125 years ago, German agricultural engineering had gained international reputation. Rudolf Sack delivered the 100,000th plough. Of these 100,000 ploughs, 28% were exported. At the same time, Max Eyth decided to follow the English model by founding the German Agricultural Society. In Hohenheim, the proposal of Freiherr von Wain was realized, and the Royal Machinery Testing Institute of Württemberg was created on 1st November 1883, which was the origin of the current Institute of Agricultural Engineering of Hohenheim University. Numerous foundations of new companies prove that occupation with agricultural engineering was considered a task for the future. Heinrich Dreyer, Gaste, started with the production of wind sifters, while the Busatis brothers in Lennep began to produce mowing blades and Glas & Lohr, Dingolfing, took up the production of sowing machines.

1908

As an entrepreneur, Robert Stock from Berlin had achieved great successes in telephone construction and with the production of high-quality twist drills. 100 years ago, he looked for a new challenge and found it in the design of motorized carrying ploughs. The characteristic feature of his machines was the engine, which extended to the front far beyond the driving axle and had to keep the back-mounted multiple-share plough in a balance. Stock´s first motorized plough, which is exhibited at the German Museum in Munich today, still has all features of an experiment, but the machine had potential. By the time Robert Stock died in 1912, 360 motorized carrying ploughs were able to be built and sold! In North America, the motorization of agriculture had made faster progress. Tractor factories were founded in large numbers. Therefore, the organizers of the first Winnipeg Trials strove to give farmers orientation with regard to the capacities of tractors and steam machines. The second test of potato harvesting machines held by the DLG was also intended to provide orientation. The winner was the potato spinner with sprung forks built by Hermann Quegwer, Bunzlau. The Saxonia drill manufactured by Siedersleben in Bernburg is also turning one hundred years old. It became a trendsetter in the development of this machine type and was continuously improved over decades. Another enterprise which can celebrate its 100th anniversary is the International Harvester Company. 100 years ago, it started to manufacture agricultural machinery in Neuss on the Rhine and was successful for decades.

1933

The seizure of power by the National Socialists did not leave agricultural engineering untouched. Minister Walter Darré enacted a ban of those agricultural machines "which replace human labour". On 11th September 1933, Professor Wilhelm Ries used this as an opportunity to denounce any kind of Luddite mentality at a conference of the German Association for Technology in Agriculture. All this did not impress German agricultural engineers. Hans Sack designed the drill "Landgräfin", which was awarded the silver prize coin of the DLG for its elastic rubber sowing roller, and a novel, flexible shaft constructed by James A Lythall, Neubrandenburg, allowed a powerful tractor to drive two and more PTO-binders at the same time.

1958

50 years ago, the Association of German Engineers (VDI) began to create an agricultural engineering section. The constituent meeting took place in the engineers´ house in Düsseldorf on 13th October 1958. At this meeting, Professor W. Kloth was elected the first president of the section. 14 days later, the first German machinery ring was founded in Buchhofen in Lower Bavaria. Dr. Erich Geiersberger considered cooperative machinery use one way of reacting to the transnational challenges in agriculture which resulted from the EC contracts. At a general level, the internationalization of agriculture was also conspicuous. Massey-Harris-Ferguson, for example, not only introduced a new company logo, but also called itself just Massey-Ferguson or simply MF. Ford attracted attention with the select-o-speed transmission. Ten forward and two reverse speeds, which were all able to be shifted under load, showed transmission construction the way into the future. Professor Rudolf Franke registered all this with interest because the inauguration of the new tractor test field in Darmstadt-Kranichstein fit this development very well.

1983

With Ignaz Kiechle, a promoter of family farms became Minister of Food and Agriculture 25 years ago. Nevertheless, technical progress was important to him. As soon as he took office, he supported programmes for the development of interactive videotext as well as projects for energy generation from straw briquettes and biogas. At the 54th SIMA in Paris, IH presented the tractor 856 XL, whose fully hydraulic power lift system Sens-o-draulic promised optimal control and easy operation. The spraying unit developed by Holder, Metzingen, which was based on a cross-flow blower, was also awarded a prize. Rauch, Sinzheim, offered the first electronic fertilizer metering system termed "Quantron", which anticipated the age of precision spreading. Another important date was 10th November 1983 when the VDI agricultural engineering section and the Max Eyth Society held their first common agricultural engineering conference in Brunswick. By bundling their forces, they initiated a development which is contributing to the international reputation of German agricultural engineering until today.

Fig. 3: In 1958 Ford first marketed the Select-O-Speed transmission with ten forward and two reverse speeds with no coupling