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STATIONARY STEAM ENGINES IN SWEDEN 1725—1806

Early data on the steam engine in Sweden briefly reviewed on the occasion of the Summer Meeting 1961 in Stockholm of the Newcomen Society for the Study of the History of Engineering and Technology.

In Sweden the steam engine made but little headway until about the turn of the 18th Century. Compared with developments on the Continent, this might seem tardy indeed but is explained by the fact that Swedish industry for centuries was wont to rely on water-driven constructions while our hydraulic power resources in those days were deemed wellnigh inexhaustible. Moreover, our fossil fuel assets being negligible, wood had to be resorted to for firing the boilers. The table on Stationary Steam Engines 1725—1806 shows plainly that the necessary steam engines were applied in the first place to the pump installations at the mines and to various other establishments where distant transmission of energy by lengthy wooden shafts or connecting-rods did not prove feasible.

The steam engines in Sweden during the 18th Century had but limited life expectancy and many of them should be regarded merely as more or less successful experiments. Parties applying for "privilegium exclusivum" or other official approval stress as a rule that they have in one way or another improved sundry details in the foreign constructions while rarely specifying what such improvements actually implied.

"N" refers to atmospheric engines—"eld- och luft-maskiner"—of Thomas Newcomen's (b. 1663, d. 1729) construction, towards the end of the century according to John Smeaton's improvements. "W" stands for steam engines with separate condensor according to James Watt's (b. 1736, d. 1819) design actually constructed by Watt and Matthew Boulton (b. 1728, d. 1809). In cases where in drawings and similar documents from the end of the 18th Century nothing is said about the system used, this fact is difficult to establish so that the table shows a question mark or two.

Foremost competitor of Boulton's works at Birmingham was the firm founded 1789 at Leeds by Matthew Murray, which in a brief period via A. N. Edelcrantz and Samuel Owen delivered at least four steam engines to Sweden.

As regards John O'Kelly's project, reference is made to Daedalus 1936, article by Carl Björkman. The plan never got beyond some correspondence with Swedish authorities.

Following a sojourn in England which included practical studies of Newcomen's constructions, Mårten Triewald (b. 1691, d. 1747),

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Location	Year	Application	System	Cyl. diam.	Designer, Constructor or Supplier
1. Project	(1725)	pumping	N		John O'Kelly, Ireland
2. Dannemora Gruvor, Uppland (iron ore mines)	1728	pumping	N	36″	Mårten Triewald, Stockholm
3. Persbergs gruva, Värmland (iron ore mines) sold 1800 to Höganäs. See No. 16	1766	pumping	N	45″	Carron Iron Works, Scotland
4. Project Dannemora Gruvor	(1769)	pumping	N		J. Cahman, Göteborg
5. Karlskrona Örlogsvarvs dockbyggnader (naval dock constructions)	1771	pumping	N		John Fellers, Karlskrona
6. Karlskrona Kronobränneri (alcohol distillery)	1779	pumping	N		J. E. Norberg, Karlskrona
7. Kalmar Kronobränneri (alcohol distillery)	1779	pumping	N		J. E. Norberg, Karlskrona
8. Karlskrona Örlogsvarvs dockbyggnader (naval dock constructions)	1780	pumping	N		J. E. Norberg, Karlskrona
9. Karlskrona Örlogsvarvs dockbyggnader (naval dock constructions)	1780	pumping	N		J. E. Norberg, Karlskrona
10. Karlskrona Örlogsvarv, nya dockbyggnaden (naval dock constructions)	1781	pumping	W		Magnus (Cosswa) Ankarswärd, Karlskrona
11. Karlskrona Örlogsvarv, nya dockbyggnaden (naval dock constructions)	1793	pumping	W		Magnus (Cosswa) Ankarswärd, Karlskrona
12. Project, ångkvarn vid Kungsholms Glasbruk, Stockholm (flour-mill)	(1797)	rotative motion	?		Lars Bergencreutz, Stockholm
13. Höganäs stenkolsgruvor, Skåne (colliery)	1798	pumping	N	28″	Robert Innes, Newcastle
14. Höganäs stenkolsgruvor, Skåne (colliery)	1799	raising coal	N	15″	Thomas Stawford
15. Höganäs stenkolsgruvor, Skåne (colliery)	1800	pumping and raising coal	N	45″	Robert Innes, Newcastle
16. Höganäs stenkolsgruvor, Skåne (colliery)	1801	pumping	N	45″	Bought from Persberg. See No. 3
17. Höganäs stenkolsgruvor, Skåne (colliery)	1803	rotative motion	N	74″	Åkers Styckebruk, Söderfors Bruk
18. Höganäs stenkolsgruvor, Skåne (colliery)	1803	pumping	W	18″	?
19. Lars Fresk's klädesfabrik, Elfvik, Lidingö (textile factory)	1804	rotative motion	W		Fenton, Murray and Wood, Leeds
20. Kungsholms Brännvins Bränneri, Stockholm (alcohol distillery)	1804	pumping	W		Fenton, Murray and Wood, Leeds
21. Ladugårdslands Brännvins Bränneri, Stockholm (alcohol distillery)	1804	pumping	W		Fenton, Murray and Wood, Leeds
22. Höganäs stenkolsgruvor, Skåne (colliery)	1805	pumping		18″	?
23. Dannemora Gruvor, Uppland (iron ore mines)	1805	pumping	W		(London)
24. Höganäs stenkolsgruvor, Skåne (colliery)	1806	raising coal	N	18″	?
25. Höganäs stenkolsgruvor, Skåne (colliery)	1806	pumping	W	53″	Fenton, Murray and Wood, Leeds
26. Eldqvarn vid Nya Kungsholmsbron, Stockholm (flour-mill)	1806	rotative motion	W		Fenton, Murray and Wood, Leeds

one of the most outstanding mechanicians and scientists of the century, in a dual sense proved the real steam engine pioneer in Sweden. On the one hand he succeeded after much travail in convincing the Swedish authorities and the Dannemora interests of the advisability of constructing at Stockholm, and installing at Dannemora, Sweden's first steam-pump which, with minor interruptions, kept running till 1735. On the other hand he described its working in an account original in all essentials, "Kort Beskrifning Om Eld- och Luft-MACHIN Wid DANNEMORA Grufvor Dedicerad Til RESPECTIVE Herrar INTERESSENTERNE, Utaf samma importanta Wärck Författadt Af MÅRTEN TRIEWALD," printed 1734. It can be termed the first authoritative account of the mode of operation of an atmospheric engine and was translated into English in 1928 (The Newcomen Society, Extra Publication No. 1).

Nor did the attempt in 1765 at the Persberg mine prove so very longlived—a mere five years (Daedalus 1939, article by T. A.). A visit in Falkirk to the renowned Carron Iron Works is recounted by A. Odencrantz in Daedalus 1948.

During the years around 1770 J. Cahman, a native of Poland, ran a magnificent foundry at Gothenburg—one of the largest establishment in the town. His project of 1769 seems not to have materialized.

About Johan Fellers (b. 1727, d. 1778) it could be mentioned that he was a naval officer serving inter alia in connection with the dock constructions at Karlskrona naval shipyard. He seems to have been technically gifted and enjoyed widespread esteem.

J. E. Norberg (b. 1747, d. 1818) was "aptain mechanicus" of the Admiralty. Following a lengthy stay in Russia, he advanced a steam engine project which in its realization proved costlier than calculated, hence was severely criticized. He also advocated a plan (1796) for propulsion of marine craft by steam engine (Daedalus 1941, article by Georg Granmalm, 1955, article by T. A.) which, however, is not likely to have led to any practical results.

Magnus (Cosswa) Ankarswärd (b. 1745, d. 1812) made his career in the Navy and may have been the sole Swedish national at the time properly to grasp the technique of the steam engine. This is attested by his structural drawings 1795 of a Boulton & Watt engine (Daedalus 1950, article by T. A.).

Lars Bergencreutz's idea of a flour-mill at the Kungsholm glassworks is not likely to have got beyond the planning stage.

It must be held remarkable that the technical head since 1797 of the Höganäs coal-mines, the Englishman Thomas Stawford (b. 1766, d. 1831), in 1802 dared to entrust the construction of a steam engine with a 74-inch cylinder diameter to two Swedish iron works and foundries, Åkers Styckebruk and Söderfors Bruk, neither of which had any experience of this sort of work, instead of purchasing the engine from some of England's renowned engineering establishments.

Everything points to the fact that the steam engine which since 1804 drove Lars Fresk's spinning and other machines in his textile mill was the first steam engine for factory use in our country (Daedalus 1958, article by Inga Lindskog).

By this token as well as the fact that the steam engine in Stockholm's flour-mill Eldqvarn had started 1806 as result of A. N. Edelcrantz's and Samuel Owen's mutual efforts, the steam engine as such was definitely introduced in Swedish industry (Daedalus 1940 and 1961, articles by Carl-Fredrik Corin).

Samuel Owen (b. 1774, d. 1854), who had been trained at Boulton & Watt's in Birmingham, subsequently at Fenton, Murray & Wood's was persuaded by Edelcrantz to go to Sweden for the purpose of installing steam engines. In his new homeland Owen is regarded as a pioneer in mechanical engineering.

For some decades ahead the steam-pumps predominated, but the first six years of the 19th Century beyond question marked the definite establishment of the steam engine in Sweden, hence this review has not been carried further. Some project or engine may not have been included in the table which should be considered merely an initial attempt at a chronology.

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