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The Chapman wind scale of 1779

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300 years ago Sweden was a European great power. Around 1700 it controlled most of coasts surrounding the Baltic Sea and the Gulf of Bothnia. This needed a powerful fleet, mastering the sea. Though the long Swedish coast had several Ship Yards, few had the capability to build large men of war. Moreover, the design of such ships was generally entrusted to masters recruited from big naval nations, as England and the Netherlands. The war king Karl XII neglected the fleet, though in 1715 he enrolled the English seaman Thomas Chapman. Actually not as a ship designer, but as a hijacker. Thomas remained in Sweden, and his son Fredrik Henrik, 1721-1808, became Sweden's most famous naval architect. The death of Karl XII in 1718 terminated Sweden's role as a great power. However, restoring it remained a Swedish dream. Ill prepared wars against Russia turned out as catastrophes. A more serious attempt was made by the king of the late 18th century, Gustaf III. He increased the Swedish armaments, especially the fleet, with subsidies from France. The main Swedish ship designers at this time were the Sheldons, father and son, originating from England. A newcomer was Fredrik Henrik Chapman. Gustaf III enrolled him to the Karlskrona Ship Yard 1781, as its head 1783-1791. Already 1778 Chapman had designed a 60 cannons line-of-battle ship Wasa (not to be confounded with the Wasa of the 1620th, which sunk on its maiden voyage 1628 and now is a famous museum in Stockholm). The new Wasa was built by Sheldon at the Karlskrona Ship Yard.

At this time English hijackers took a heavy toll of Swedish merchant ships in the North Sea. Therefore, a Swedish "neutrality guard" was established the summer of 1779, consisting of several large war-ships patrolling the North Sea. Amongst them was the Wasa. For the Wasa it was not only the maiden and test voyage, but also a competition with ships of Sheldon's design.

The Wasa had a handheld pressure anemometer, of the Bouguer type, built by Chapman, Fig. 1. Kreüger (1841) tells us that a wind scale was designed. The wind pressure was measured with the anemometer, and after discussion with all the officers the proper name of the wind force was decided. This resulted in the wind scale of Table 1.

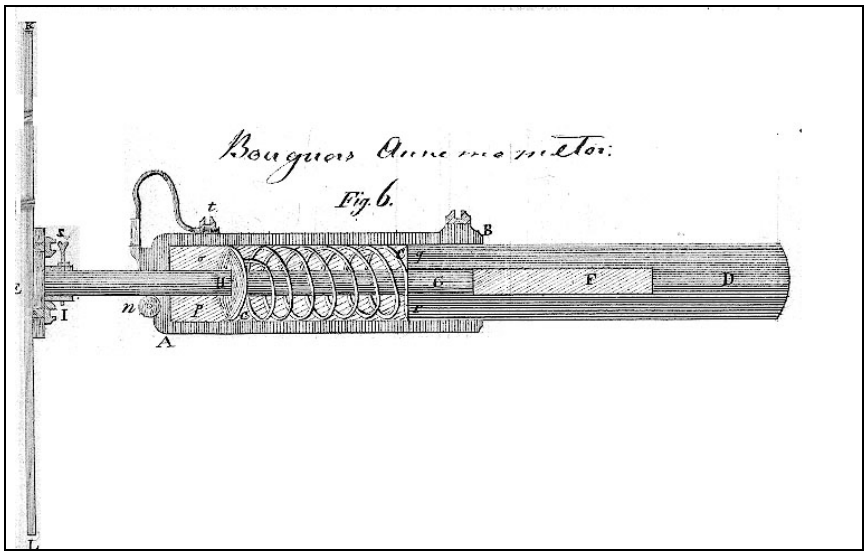

Fig. 1. The Bouguer anemometer built by Chapman. The quadratic pressure plate to the left had a side of 29.7 cm. From the Royal Academy of War, the Kreüger archives.

Table 1. The 1779 Chapman wind scale. Wind pressure in skålpund per Swedish square foot, air speed in Swedish feet per second. 1 Swedish foot =29.7cm,
1 skålpund = 0.4251 kg. Mostly after Kreüger (1841).

Swedish name	**English name**	Wind pressure	Air speed.
Lab. Bram-segels Kultje	Weak Topgallant Breeze	_	20
Bram-Segels Kultje	Topgallant Breeze	1	28.5
Frisk Bram-Segels Kultje	Fresh Topgallant Breeze	1_	35.5
Märssegels Kultje	Weak Topsail Breeze	2	41
Styf Märs-Segels Kultje	Stiff Topsail Breeze	2_	46
Refvad Märs-Segels Kultje	Single-reefed Topsail Breeze	3	50
Styf refv. Märs-Seg. Kultje	Double-reefed Topsail Breeze	4	58
Under-Segels Kultje	Course Breeze	5	65
Half Storm	Half Storm	7 à 8	79
Full Storm	Full Storm	10à12	96
Orkaner	Hurricane	20	130
Den starkaste Orkan som blifvit utrönt	The most violent Hurricane experienced	30	159

Chapman also designed a pressure plate anemometer, mounted on a building in the Ship Yard, Fig. 2. The anemometer still remained in 1851, though nothing is known of its fate after that. I have not managed to find any possible records of observations from it.

Beaufort's wind scale of 1805 was used by Robert FitzRoy on his famous voyage around the world 1831-1836, with Charles Darwin as 'naturalist' before it was adopted by the British Navy 1838. Later it was internationally adopted and is still in use.

The Chapman scale remained a national business. In his 1841 paper Kreüger says nothing about the use of the Chapman scale. An instruction for light-house weather observers from the pilotage director from 1856 refers to the names in the scale as those generally used by seamen. This paper also discusses speeds and pressures for the weaker winds and gives lower limits for speeds and pressures than in Table 1. In a later instruction from 1872 the word "kultje" is replaced by "bris". The light-houses were using this scale far into the 20th century.

The rationale for Chapman's wind scale was a demand for more exact wind data. The subjective estimates of wind force are ambiguous. As Kreüger wrote about 1850, when introducing his wind gauge in the Swedish pilotage network: "A wind called *Storm* by one person, may well be considered *Double-reefed Topsail Breeze* by a second person and *Stiff Topsail Breeze* by a third one."

During 1782-1785 the Karlskrona Ship Yard under Chapman built ten 62 cannons line-of-battle ships, (somewhat modified Wasa type) and ten 40 cannons frigates. This marked the summit of the Karlskrona Ship Yard. Neither earlier nor later has there been such an activity there. Double the number of ships was planned, but they run out of money. Still, the Swedish navy has never been stronger than in the late 1780th .

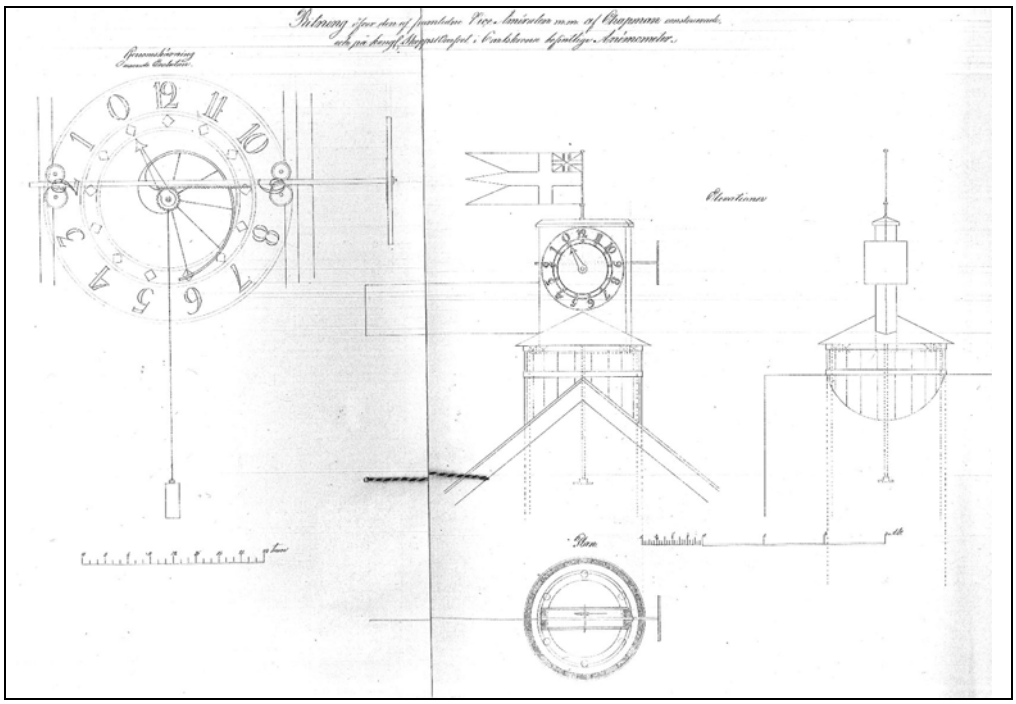

Fig. 2. The Chapman anemometer. The date of the drawing is not given. However, the flag of the union between Sweden and Norway shows that it is made after Chapman's death 1808. The union was formed 1814. From the Royal Academy of War, the Kreüger archives.

Chapman's 60 cannons line-of-battle ship Wasa. From a painting by J. Hägg.