Historical Developments in naval propulsion (1829-1830). New insight into Feathering Paddle Wheels (Morgan Wheel) and the Screwpropeller, invented in 1829

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The port of Trieste has been , in summer and early autumn 1829, an "open-air water stage" for two important events in the history of technology: first the propelling of a steam-ship with a new type of feathering paddle-wheel , which can be considered the ancestor of the "Morgan Wheel", a paddle-wheel which is still used in our modern world and, second the test on propelling an other steam-ship by means of a prototype of the screw propeller . An outline of this events will be described in this article.

Fixed paddle wheels, mounted and connected to slowly rotating machinery are still used, mostly on American rivers. The fact that paddle wheels are used, rather than screw-propellers, may be for cultural, rather than strictly technical, reasons: since the passengers on board are in search of the atmosphere of the good old bygone days, ship-owners on the Mississippi etc. are keen to meet this demand. Whatever the case, the paddle wheel is much better than the screw propeller at accelerating and slowing down in the vicinity of points of embarkation so when several points are in close proximity it is advantageous to use a paddle wheel vessel.

In Europe, the only remaining paddle wheels (some are still the original paddles) are mounted on vessels in service on lakes in Switzerland and, possibly, rivers (the Donau, Rhine) for similar market-driven reasons as mentioned earlier. In terms of engines, these European vessels are quite different from those in the US because this paddle-wheels are "feathering"; this type of paddle-wheel is called the "Morgan Wheel". On the Swiss lakes we may well suppose that the close proximity of embarkation points is such that the economic, competitive matter of acceleration and deceleration is by no means of secondary importance for keeping them in service. The most recently built vessels I have encountered with a "Morgan Wheel" date back to the 1920's whereas others I have seen were built in the 19th century.

If you visit the Science Museum in London you can find a model of the "Morgan Wheel", as well as the models of the two preceding projects (King Williams[1], Elija Galloway[2]), which will be briefly described below. The (legal) questions that accompanied these inventions will be also outlined. The "Morgan Wheel" is nowadays not completely obsolete in marine propulsion: it has been employed among the ultra-modern technologies applied to man-propelled mini-vessels designed to compete in international races like the "waterbike".

The "Morgan Wheel" is geometrically formed by a 9 fold repetition of a non-parallel four sided wheel and its high performance levels in propelling vessels stem from a strictly geometrical-differential reason, which will be explained in a further article with the help of a Mathematical Electronic Sheet.

Only a brief summary of some new insights into side inventions follows.

1. Two mechanisms for naval propulsion first tested in the Gulf of Trieste in 1829 (Austrian Empire)

During the summer and early autumn of 1829 on the relatively calm waters of the Gulf of Trieste in the Adriatic Sea, two important, completely new mechanisms for naval propulsion were tested.

One, the screw-propeller, was increasingly developed, implemented and technically enhanced in the decades to follow until it was adopted by modern naval techniques as the almost exclusive means of propulsion.

The other experiment, or better, pilot test, was practically unknown till now: the employment of the feathering paddle-wheel of E. Galloway whose patent would later be sold to a British-Triestine W. Morgan. He later developed a similar type of paddle-wheel for naval propulsion based on the same principle, the "Morgan wheel", a type of propelling paddle-wheel. It was mounted on the ships Mr. Morgan owned: the Steamships "Carolina" and "Archduke Francesco Carlo". Both of them were in service on the seaway from Trieste to Venice and vice versa.

1.1 The experiment of the screw-propeller in the Port of Trieste 1829

The experiment of the steam-ship "Civetta" (J. Ressel the inventor - C. d'O. Fontana the ship-owner) has been widely recognized as the first practical experiment of employing this mechanism and its importance is undisputed; however, the very existence of the experiment is very little known at least internationally, beyond the