

ironclads made the evolution easily? One circumstance which will seem still more extraordinary is that at the height of the gale of October 1st, the *Solferino*, having disabled her engine through some damage in its piping, lay to with her sails alone from 9.30 a.m. to 1 p.m. So little had the possibility of such a feat been contemplated, that the *Solferino* had not even been fitted with the sails ordinarily used for this purpose, and it was only after her return to Brest that they troubled themselves to give her the set of sails proper for this case.

There is no need to enlarge on this point, so I shall quote but one of the tables where the speed under canvass is noted in knots per hour: *Napolcon*, 8.3; *Tourville*, 7.4; *Magenta*, 7.2; *Couronne*, 7.1; *Solferino*, 7; *Normandie*, 6; *Invincible*, 6. If we take into account the difference of displacement, that is, the weight carried, and of the surface of sail, that is, the means of propulsion, these results are more than satisfactory.

As success makes people ambitious, we can easily understand the readiness with which sailors seize on the idea of enlarging the masts and sails on the iron-clads. On the one hand, this would augment the sources of safety, speed, and freedom of motion, and regain, at least, in part, the advantages which were thought to be lost. On the other, it would develop to an amount hard to judge of, the sphere of action of the new vessels. All this is true, but there is a limit which military considerations will not allow us to overstep at any price. It is known that the screw has the dangerous property of attracting to itself everything that floats alongside a vessel, and that small objects, of little consistence or hardness, may, precisely because they are so, disable this organ of propulsion when they get entangled in its parts. Consequently, the screw-ship of war should have the power, before going into action of unshipping in a few minutes her masts and rigging.—Consequently, also, her masts and rigging must be of a very simple character, admitting of being shipped and unshipped with the utmost ease. This necessity points out a limit to be observed, and I may be here permitted to recommend to the notice of those whom it concerns, an idea of English origin which enjoys a large share of favor among our neighbours. The English, on their iron-clads, make the lower masts of cast-iron, and these not only satisfy all nautical and military requirements, but, being hollow, are also used as a means of ventilation, another condition to which we cannot pay too much attention, as it exercises a very important influence on the health of the crews.

To make our account of the manœuvring of these vessels complete, we must add a few words as to the experiments made in turning them. They obey their helms in the most satisfactory manner, and in all the letters I have seen, I have not found a single observation which can be interpreted to their disadvantage. Their extreme length, however, causes them to describe in their evolution circles of larger radii than shorter vessels do. This was known beforehand, and the only ground for surprise is that the difference was not greater, especially in the ships armed with the ram. A comparison of the vessels of the squadron classes them as follows, in this respect: the *Tourville* in the first place; second, *Couronne* and *Napolcon*; third, *Invincible* and *Normandie*; fourth, *Solferino* and *Magenta*. The radius of the least circle described by the last two was 380 metres, while that of the *Couronne* was only 305.