

Circular Ironclads.

The successful launch of the *Inflexible* having placed the British Navy in possession of the most powerful ironclad in the world, our attention is naturally directed towards the movements of other Powers in order to discover how long we shall maintain the pre-eminence, and what is the nature of the engine of war which bids fair to threaten our position. The Italian rivals of the *Inflexible* are so similar to that vessel in the vital principles of their design that the only subject for serious consideration which they suggest is the relative efficiency of the English and Italian productions, viewed with regard to the objects aimed at by their architects. Happily, upon this score our minds are easy, for it seems but too probable that the Italian vessels have not a sufficient margin of stability to provide for the too probable contingencies of a naval engagement, whereas these probabilities have been wisely foreseen and the stability as cleverly obtained by the designers of the *Inflexible*.

Viewed defensively, the resistance of the sides of the Italian vessels bears a ratio of about five to seven compared with that of our own ship; and although the guns of our rivals will weigh 100 tons against eighty-one tons in the *Inflexible*, yet, when we take into account the greater difficulty of working the heavier gun, and the fact that its superior efficiency is at such long ranges as a mile and a-half to two miles, we see no reason for supposing that even when the Italian vessels are afloat—whenever that may be—the *Inflexible* will be outshone in any of the desiderated qualities for a ship of her description.

It is not, then, in vessels of the *Inflexible* class that we find cause for fearing that England will occupy a second rate place in the race of inventions for naval warfare. Whatever anxiety we feel upon this subject does not relate to the quality or quantity of efficient ironclads of recognised types that our naval authorities in their wisdom deem sufficient for the defence of the nation and its dependencies. But while we are perfectly contented and easy in our minds regarding the foresight and skill of the constructive staff of the Admiralty, yet it is impossible to close our ears to the great outcry which has proceeded of late from certain quarters regarding the wonderful qualities of the Russian circular ironclads. If these vessels do really possess the valuable—nay, almost miraculous—attributes with which they are credited by Mr. Reed and Lieutenant Goulaeff, it is certainly high time that we bestirred ourselves and did something towards providing our fleet with specimens of the *Popoffka* type. A short time ago it was currently reported that the Controller's Department was considering the question with a view to building some circular ironclads, should the Constructors of the Navy report favourably upon the subject. The subsequent inaction of the Admiralty in that respect, and the vigorous criticism which the vessels received from the Admiralty officials who attended the recent meetings of the Institution of Naval Architects, lead us to conclude that their lordships's professional advisers do not approve of the circular system. In this decision we are not at all surprised; nor do we see any reason for viewing it with regret. Circular ironclads have never been the objects of our admiration, and one of the most difficult problems we have ever been called upon to solve is the ground of Mr. Reed's persistent advocacy of the system:

The late Chief Constructor of the Navy is not the man to knowingly ally himself with

an unsound cause, or support a fallacious argument. The remarkable success of his professional career has resulted as much from his shrewdness as from his mechanical skill; and when we see his name identified with anything novel in naval designs we at once conclude there must be something in it. We confess that upon this question of circular ironclads Mr. Reed has quite upset all our calculations regarding him; and in the face of the obvious fallacies which have attended his advocacy of these paradoxical monsters, we hardly know whether to take the matter seriously or as one of Mr. Reed's jokes.

A person occupying the position of Mr. Reed incurs great responsibility when he gives utterance to opinions on naval questions, especially those relating to ship building. The member for Pembroke must certainly be well aware of that fact, and although he does not now occupy the position of professional adviser to the Admiralty, yet the experience he has acquired, and the position to which he has attained among naval architects, render him hardly less responsible in regard to his published opinions than when he was a servant of the State. On these grounds, we are compelled to assume that Mr. Reed really believes that this country should possess itself of circular ironclads, in lieu of spending the same money upon other types; and proceeding upon that supposition, we shall now state the objections which we have to these ships, and point out the fallacies which underlie the arguments in their favour put forth by their few supporters in this country.

The whole question of naval construction for the maintenance of our maritime supremacy and national integrity resolves itself into one of expenditure, or, in other words, "what is the best way of spending a certain sum of money in ships of war?" Because a certain ship is more powerful than another ship is no argument for spending money upon those of the former instead of those of the latter class. For it may be that an individual ship of the first class is equal to two of the second, but costs four times as much, in which case it is evidently better to build four vessels of the latter type with the money required for building one of the former type, as by so doing we, relatively, get double value for our money. Applying this to the question of Circular Ironclads versus *Inflexible*, if to carry four 81 ton guns on a circular ironclad similarly armed to the *Inflexible*, and capable of steaming at the same speed for the same length of time as that vessel, costs very considerably more than to do the same thing with the *Inflexible*, we naturally ask for what advantage we pay the difference in cost. The reply will probably be, the superior protection afforded to the boilers, machinery, and magazines in the circular ships; and to that we ask what would it cost to secure the same immunity in the *Inflexible*? Unless it can be shown that whatever is achieved in the circular ship cannot be likewise attained in the *Inflexible* for the same expenditure of money we are at a loss to know why we should deviate from what is, after all, something like a ship, and adopt a form which is more like anything else. But the case for the *Inflexible*, as compared with the circular ships, is far stronger than we have suggested. The displacement of the *Inflexible* is, in round numbers, 11,000 tons, and the most sanguine believer in the circular ships—Lieutenant Goulaeff—estimates that 50,000 tons displacement would be required in order to secure the same speed of fourteen knots. Our own opinion, based upon Mr. Froude's experiments, is that far more than 50,000 tons would be

reached before the dimensions requisite for a fourteen knot speed had been attained. Hence in the matter of speed the price of five times the *Inflexible*'s displacement must be paid before the two vessels are upon even terms. But what is to be said upon the question of maintenance, of speed for a given time so as to traverse a certain distance? It has been admitted by Mr. Reed that vessels of the circular form offer five times the resistance of ordinary vessels, and hence, if the two vessels were of the same size, it would require five times the horse power, and therefore five times the coals to enable the circular vessel to steam the same distance as a ship of the ordinary type. The *Inflexible* carries 1200 tons of coal, which enables her to steam for six days at fourteen knots; the circular ironclad of similar speed would require 6000 tons in order to perform the same distance. Such facts as these ought to settle the question with any unprejudiced mind.

The origin of the mistake into which men like Admiral Popoff have been betrayed is to be found in the economical success of Mr. Reed's short ships over the very long *Minotaur* and *Warrior* classes which preceded them. Every one knew at the time that a price was being paid for the increased ratio of breadth to length adopted by Mr. Reed. The only question was whether the cost of the additional horse power and coals required to obtain the same speed was compensated for by the reduced first cost of ship and her after maintenance, facility for manoeuvring, and increase of armoured protection. This question was answered on all sides in the affirmative. But it is evident to every body that there must be a point at which the increase of breadth should stop if economy is to be considered. The proper ratio is probably found in the *Hercules* class for the duties of such ships, and in the *Inflexible* and *Ajax* classes for duties such as they are expected to perform. The increase of resistance when higher ratios are adopted add so much to the cost of machinery and coals, and reduce so considerably the possibility of attaining useful speeds, that any advantage of another character is obtained at too high a price altogether. We do not doubt that circular ironclads of 14 knot speed an enormous fighting power can be built, but what we doubt is that the same thing cannot be done by adhering to ship shape form and proportions, and at a much less cost. The *Popoffkas* have, no doubt, a useful function to perform in certain waters, but as ships they have, in our opinion, no *raison d'être* whatever. As portable martello towers, as Mr. Simuda said, "for forts not fixed to the ground," they would probably prove useful, as, in that case, just sufficient engine power to secure locomotion would be needed; but to navigate the seas, to fight in of battle, or, in short, do anything except of a warship, a more expensive and different mode of construction could scarcely be devised. If Russian circular ironclads be the only logic with which our naval authorities can be frightened into activity, we think we shall wait a long time for the results we require. If Mr. Reed would wisely use the influence he possesses as the member for Parliament to whom the country looks for the wisest counsels upon naval construction in the House of Commons, he would attend less to Russian theories and more to English realities. — *Broad Arrow*.

The Army pay Warrant.

The Royal Warrant granting an increase of pay to the army has at length been published. The delay in its appearance is somewhat