

CURIOSITIES OF NAVAL ARCHITECTURE—ROUND SHIPS AND GLOBULAR VESSELS.

BY LIEUT.-COL. C. FIELD.

We have all heard of the "Three Wise Men of Gotham," who "went to sea in a bowl," and doubtless we have, most of us, tempered our sympathy with their fate with the reflection that on this occasion their wisdom was at fault or they would not have tempted Providence in such an unsuitable craft for ocean travel. But were they so very foolish after all? Is a round vessel necessarily unseaworthy? At one time and another there have been found a good many people ready to answer this question in the negative. The late Mr. John Elder, for instance, a noted shipbuilder in his day, was at one period a strong advocate for the construction of circular ironclads. Two warships of this kind were actually built by the Russian government on a modification of his plans. After all, a circular vessel is anything but a novel idea. Herodotus says: "Vessels that sail down the river to Babylon are circular and made of leather;" and, strange to say, such circular boats, made of a framework covered with skins, are in use at Bagdad at the present day. Perhaps, though, we ought not to consider any survival strange when we consider that we are dealing with the "unchanging East."

Somewhat similar, though much smaller, are the round coracles used in the East Indies to pass the rocky rapids of the Boani River. These little vessels are made of split rattan covered with oilcloth. They are called "parachals" and are in the form of a shallow saucer about two feet ten inches in diameter and only seven inches deep. Their crew consists of one man, who steers with a small single-bladed paddle. In this connection we may note that the coracles that have been in use in some parts of Great Britain for thousands of years are, though not circular, yet very nearly as wide as they are long.

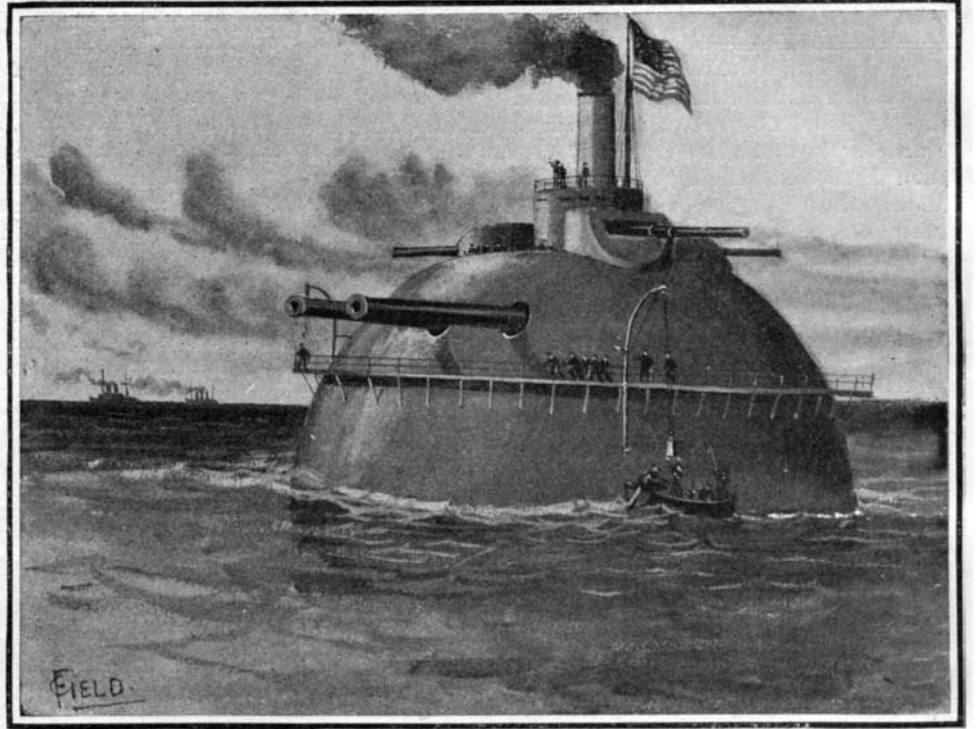
In the early days of sailing ships—at any rate in European waters—the "round ship" was a usual and distinct type as opposed to the galley class of vessels, which relied principally on the oar for propulsion and were called "long ships" in contradistinction to the others. This merely referred to their shape and had nothing to do with the modern naval phrase which stigmatizes an inhospitable ship as "a long ship," the interpretation being that it is a vessel in which there is "a long time between drinks." We may note in passing that a completely circular vessel was sometimes used to carry war machines as in the accompanying illustration.

One has only to look at the ancient pictures of sea-fights in the middle ages that have come down to us to see that the single-masted "cogs" or "coques" that were the battleships of that period were very much of the shape of a walnut shell and though not actually circular were very much more nearly round than approximating to the shape of modern ships. But as the progress of navigation and improvements in the rigging of sailing ships brought the sailor's art nearer to perfection, so the advantages of a longer and narrower hull became apparent. The introduction of steam accentuated this, and now for many years ships and steamers have shown a tendency to increase in length in greater proportion to their breadth of beam. The advent of armor and very heavy cannon in war-vessels and the advantages of turning easily to use and avoid the ram, for a time restricted this tendency in the case of men-of-war. It was at this period that cer-

tain naval officers and warship constructors pushed the idea of a wide beam giving a steady platform for heavy guns and with great powers of flotation to an extreme and advocated the building of circular ironclads.

Mr. John Elder, as noted above, was one of the first apostles of the circular ship about 1868. He designed one in the first place which was to act as a ferryboat between Liverpool and Birkenhead, arguing that the round form of vessel could carry far more in proportion to its weight and given draft of water than could any other form. He also made plans for circular sea-going and coast-defense warships.

Later on, in 1873 and 1875, Russia launched the ironclads "Novgorod" and "Admiral Popoff" in the Black

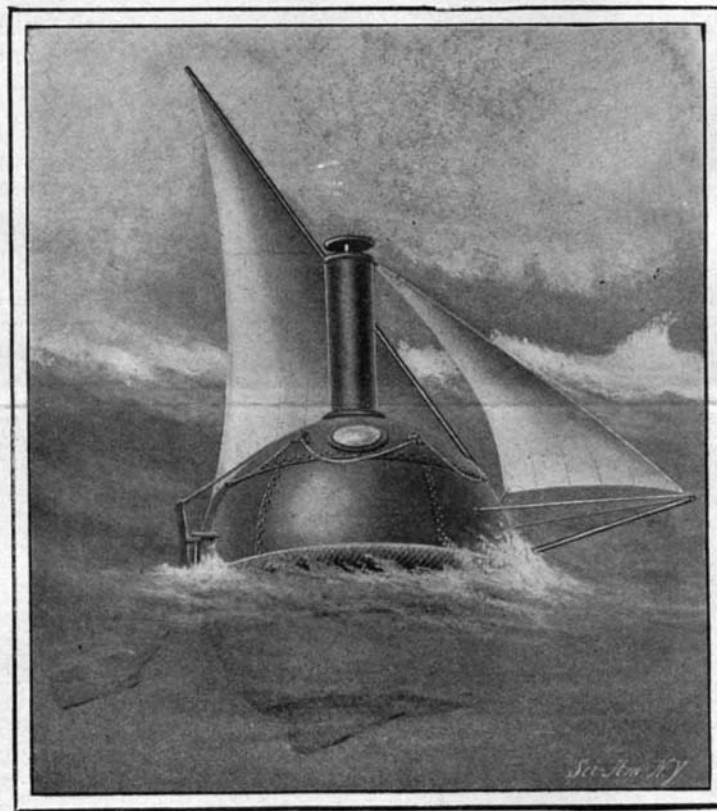


The "Trident," a Proposed Globular Ship.

sea, although each was provided with no less than six propellers. Their shape, of course, heavily handicapped them as regards speed. In their particular case, however, this was not a serious drawback and was more than counterbalanced by their great steadiness and light draft of water, which would enable them to fight at an advantage in the defense of rivers and estuaries, for which purpose they were especially designed. Mr. E. J. Reed, the eminent English naval constructor, who took a trip in the "Novgorod," says that with a strong breeze and a considerable sea the "vertical rise and fall in the center of the vessel seemed absolutely nil," and "I, who seldom escape some sensation of sickness at sea, felt perfectly at home and comfortable, throughout the voyage."

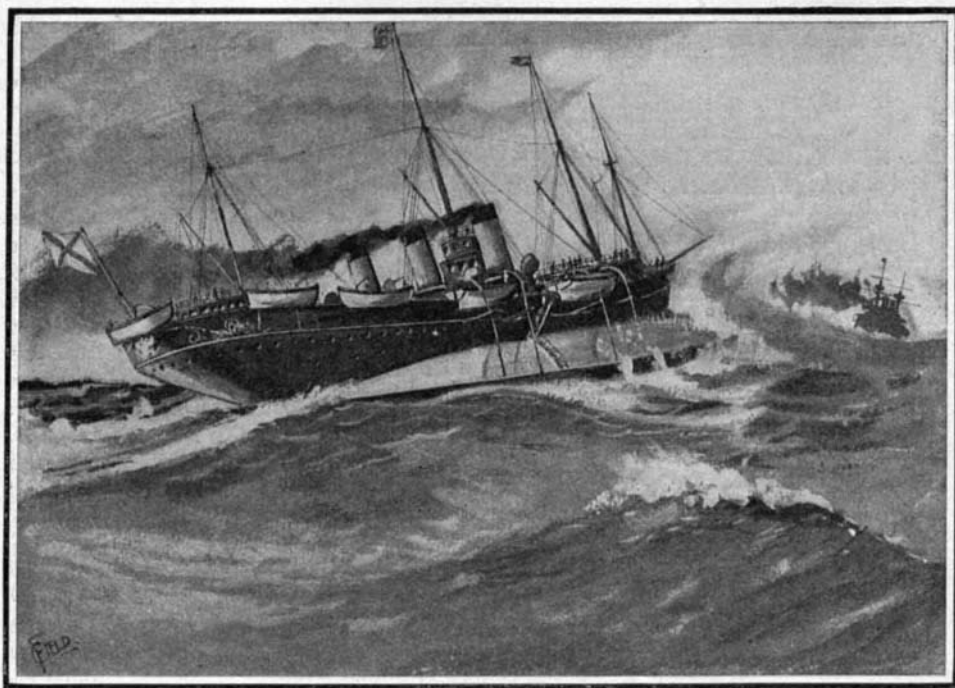
Possibly it was this feature in the "Popoffkas"—as those ironclads were called after their designer—that led to the building of the famous yacht "Livadia" for the Czar of Russia. This was a most extraordinary vessel. She did not give one the impression of being a round ship, as her bow and stern overhung the water like those of an ordinary vessel, but that portion of her which floated in the water was almost, if not quite, circular. Her bottom was absolutely flat, and she had three funnels placed abreast in the center of the ship. She was built at Govan by John Elder & Co. and launched in 1880. She had a displacement of 4,000 tons and steamed about ten knots an hour. Far from realizing the expectations formed of her, the "Livadia" proved a thorough failure, was removed from the list of imperial yachts, and having been re-named—appropriately enough, the "Opyt" (Experiment)—she was told off as a transport. As she is said to be capable of carrying 4,000 men it is possible that she has at last found a sphere of usefulness.

One of the naval officers to whom the novelty of the Russian circular ironclads greatly appealed was Commander—now Admiral—Sir G. H. U. Noel, R.N., and in his essay on "The Best Types of War Vessels for the British Navy," for which he gained the Royal United Service Institution's medal in 1876, he advocated "mastless circular vessels for coast defense." His ideal was a completely armored ship of 8,500 tons and of 210 feet diameter armed with a dozen 12-inch guns. It is interesting to note that as regards this point in his design his ideas of nearly thirty years ago agree with our very latest theories. The enormous "Dreadnought" will carry only guns of this caliber and no medium artillery at all. Capt. Noel's ironclad was to be, in short, a big circular floating fortress whose sloping armored sides gave very great protection from fire and whose sharp armored edge where the upper slope met the outward slope of the saucer-like underwater part of the hull, would, he contended, render her, if not invulnerable to the ram, at least a very dangerous ship to attack with that weapon. His views receive a certain amount of corroboration from the fact that the edge of the armored deck of the unfortunate "Victoria" cut completely through the stem of the "Camperdown" when accidentally rammed by her on that disastrous day off Beyrout in 1893. The twelve big guns were to be mounted on disappearing carriages, coming up to fire over the top of the iron rampart and sinking down to be re-loaded under its protection. The more upright part of the breastwork was to be made of 14-inch armor, and the sloping portions, as well as the under surface next the edge of



Capt. Doenvig's Life-Saving Globe.

Sea. These circular ships, which were specially intended for the defense of the River Dneiper and the Sea of Azoff, were built from the designs of Vice-Admiral Popoff and for a time were considered to mark an advance in naval construction. But it was not for very long and both have now for some years been removed from the effective list. The "Novgorod" had a diameter of 101 feet and drew about 13 feet of water. She had a displacement of 2,490 tons, was plated with 9 inches of armor and carried a couple of 11-inch guns in a central barbette. The "Popoff" was a rather bigger vessel, having a diameter of 121 feet, a displacement of 3,550 tons, 11-inch armor, and 12-inch guns. Neither of these quaint monsters of the deep was capable of steaming more than



The Yacht "Livadia."

the circumference, to be 3½ inches thick. She was to have four keels, three propellers, and two rudders. This class of fighting ship has not hitherto materialized and there is nothing in the lessons of the recent Russo-Japanese war to make us think that we shall see anything of the kind in the immediate future.

But the circular form still has its attractions for the inventor, and only a year or two ago another circular—nay, almost globular—iron-clad was designed by a Mr. Stokes, of New York. This modern Gothamite, determined to emulate his famous predecessors, intends his bowl to be the exact shape of an ordinary gas globe inverted. He claims that this will give the maximum of buoyancy and armor-carrying capacity. She is to be a much bigger affair than the "Popoffkas," having a displacement of over 11,000 tons. The "Trident," as she is christened by her inventor, is to have an armor belt no less than 18 inches thick extending from considerably below the water line to a few feet above it, where she is encircled by a gallery or balcony. Above this everything is to be protected by 12-inch plating. She is to carry a pair of 15-inch guns fixed immovably in their places, so that to direct them to the right or left the vessel must be bodily revolved in the required direction, while elevation or depression are to be obtained by tilting the ship by movable



Circular Medieval Vessel with Stone-Throwing Engine.

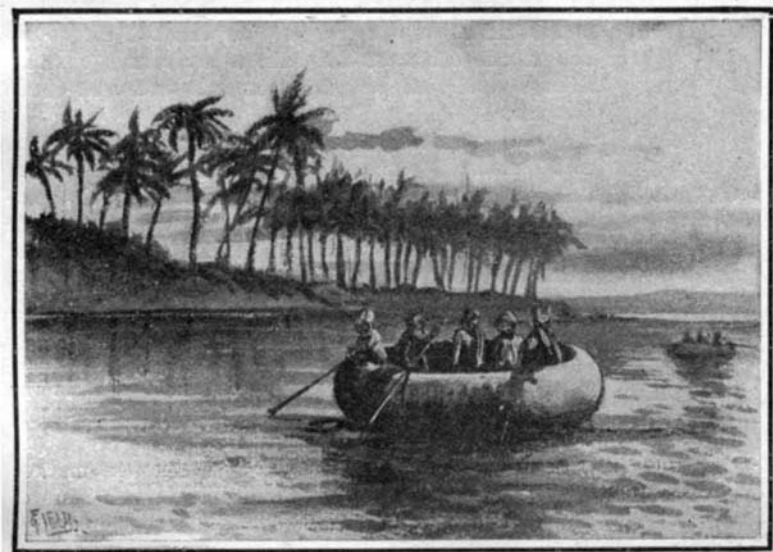
pressure of water, so that work can be carried on at greater depths than with other contrivances. The craft is made of stout cast iron and weighs six tons. It can move about by the aid of a rudder and three screws driven by electricity and descends by the simple method of attaching a receptacle holding sufficient

ballast to overcome its buoyancy. When it is necessary to ascend this weight is disconnected by means provided inside the "Worker" and she "bobs up serenely from below."

The two latest attempts at globular vessels are the "Doenvig life-saving globe" and the "auto-propulseur Adam-Boudin," an extraordinary ball-like affair that trundles itself along the surface of the water. It consists of an inner

and an outer sphere. The outer, which is provided with a kind of ridge or keel and a series of fans or blades, revolves upon bearings on the inner one and so moves the whole boat—if boat it may be called—along in the water. The engines of 24 horse-power and the unfortunate passengers are boxed up in the inner ball, access to which is obtained through a man-hole at the axis. There must be many pleasanter ways of "going down to the sea in ships," and it is to be feared that this weird vessel will never make its inventor's fortune. It is, indeed, difficult to understand what advantages it presents for any purpose whatever.

The "Doenvig globe" is especially intended for carrying on board ship as a kind of life-boat in which the crew and passengers may escape from the violence of the tempest that has wrecked their vessel. She has some hand-worked means of propulsion which is said to give her a speed of 2½ knots under favorable circumstances. A couple of triangular sails are attached to a central ventilator which serves also the purpose of a mast. Inside there is a deck surrounded by a ring of provision lockers forming a circular bench, while below this compartment is a reservoir of fresh water. There are three scuttles in the upper part of the globe, where also is situated the manhole through which the shipwrecked mariners can get in-



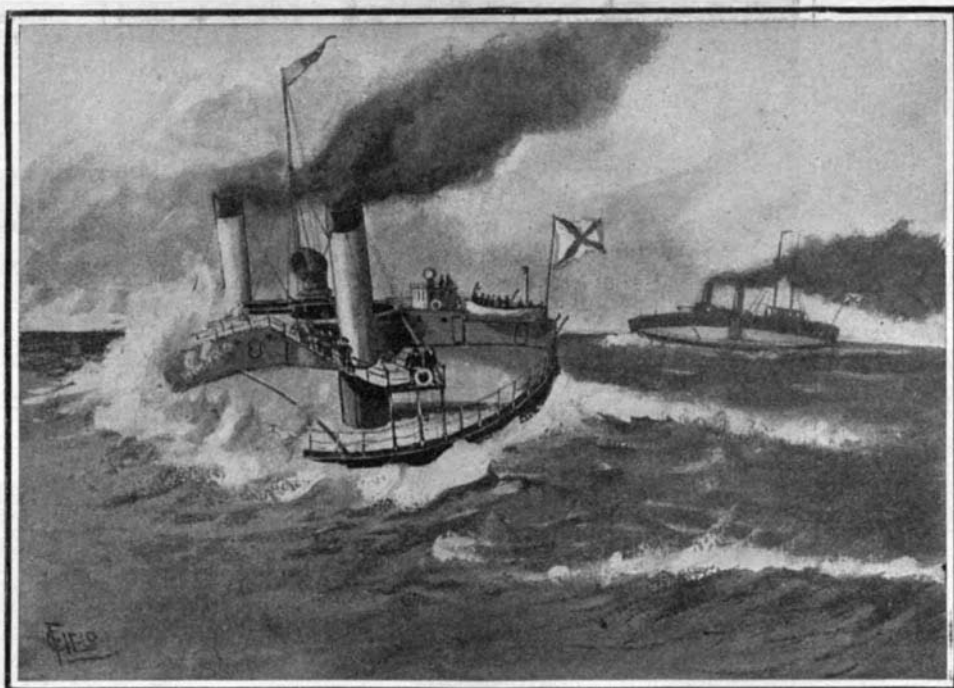
Circular Boats on the Euphrates.

counterpoise weights which are provided for the purpose. She is to have three smaller guns in fixed turrets, and an armored conning tower. There will be no ports or scuttles in the "Trident." Air will be obtained by a system of ventilation from the upper deck, while for light the ship's company will have to be contented with incandescent lamps. Her four propellers are placed equidistantly round her hull and enable her to turn round on her axis to direct her guns, and possibly may enable her to crawl through the water.

An Italian engineer, Signor Piatti del Pozzo, not very long since applied the principle of globular construction to a species of submarine boat which he termed the "Pozzo submarine worker." As its name implies, this queer spherical craft is not intended so much for traveling as for building and salvage operations below water. So while rapid progression is not possible, the shape gives strength to resist the

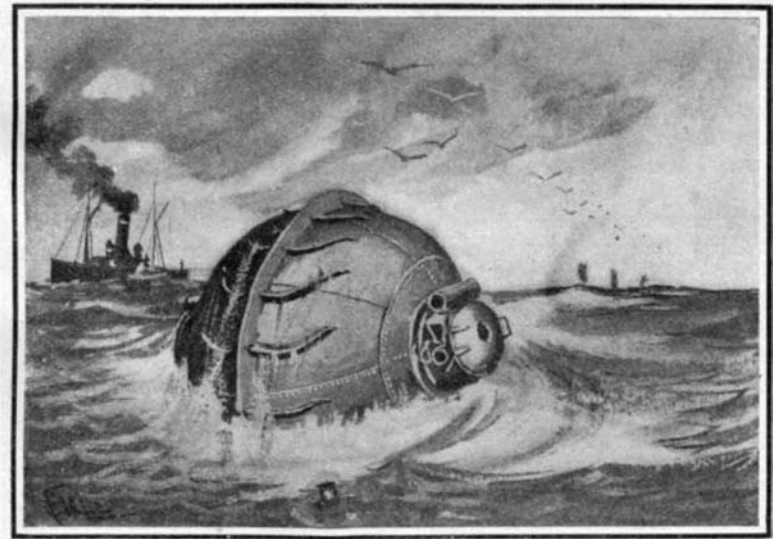


Circular Coracle Used on the Boani River.

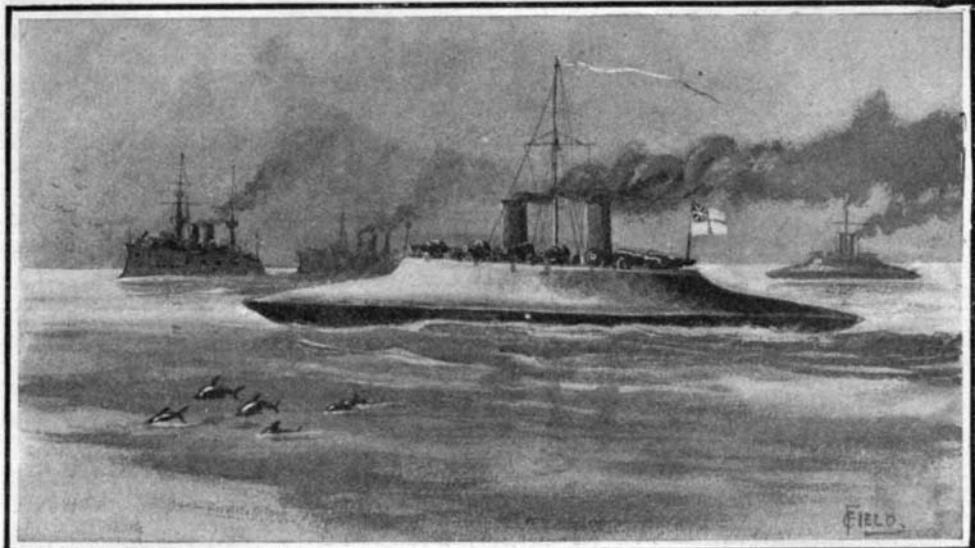


The "Popoffkas": "Novgorod" and "Admiral Popoff."

side of this odd vessel. She has been tested and seems to answer the purpose for which she has been built very well. It is evident that, properly trimmed and ballasted, a globular vessel of this kind could not lose any of her buoyancy by taking in water in roughest weather and would ride comparatively steady over the heaviest seas. This and the "Pozzo submarine worker" appear to be about the most useful and practical of the circular and globular craft that have been evolved from the ingenious brains of our modern inventors. Whether the building of similar vessels of a bigger and more powerful nature will ever be undertaken on any great scale is more than doubtful. Occasionally some eccentricities of naval architecture may be designed and even constructed; but they will remain eccentricities, and will serve only as the exceptions to prove the rule that the elongated hull with a flat deck must always be the best type of vessel.



The "Auto-Propulseur" "Adam Boudin."



Admiral Noel's Proposed Circular Ironclad Battleship.