

## AN AMERICAN SHIPBUILDER ON IRON-CLAD FRIGATES.

The editor of the Boston *Commercial Bulletin* states, in his introduction to Donald McKay's communication published in that paper, that it was written in Paris after its author had just completed a tour of the French and English navy yards. We condense some parts of that letter and give extracts from other portions of it. Mr. McKay states that for common peaceservice, the old kind of ships will probably be continued on foreign stations, but "for actual warfare their time is past." He begins with the French navy. In addition to ten iron-cased floating batteries, constructed during the Crimean war, the French have afloat two floating batteries of fourteen guns each, which have a speed of six and a-half knots per hour, and both of them are covered with 4½-inch iron plates. There are also four iron-cased frigates afloat, namely, the *La Gloire*, *Normandie*, *Invincible* and *Couronne*. They have each engines of 900-horse power, a speed of thirteen and a quarter knots per hour, are plated from stem to stern, from six feet below the water line to the upper deck with 4½-inch plates, and they are armed with thirty-six rifled 30-pounders. Their length is 257 feet; width fifty-six feet. The steering house is an iron tower placed behind the main mast. These are all wooden vessels, but plated with iron, with the exception of the *Couronne*, which has an iron frame. Besides these sixteen iron-clad vessels of different sizes and characters, there are two armor-clad rams—the *Solferino* and *Magenta*—which have engines of 1,000 horse-power each, and carry fifty-two guns. They are wooden built vessels covered with armor. The ram is secured on the stem at about three feet below the load line; their decks are plated under the top plank with ¾-inch iron; their speed is thirteen and a-half knots per hour. Eighteen armor vessels are therefore fit for service in the French navy.

On the stocks the French have two armor-clad batteries, which have engines of 150 horse power, and are intended to carry fourteen guns; also seven others which are intended for harbor defense. Besides these, there are ten large iron-cased frigates of the *La Gloire* class on the stocks. If required, they could all be completed and ready for sea by next autumn.

The English have four iron-cased frigates completed and in service, namely, the *Warrior*, *Black Prince*, *Defence* and *Resistance*. The two former are the most formidable armor-clad frigates afloat. Their engines are of 1,250 nominal horse power (6,000 actual) and they carry forty guns; the two latter have engines of 600 horse power, and carry eighteen guns—Armstrong 100-pounder rifled and 68-pounder smooth-bores. The speed of the *Warrior* at sea on her first cruise was twelve and a-half knots per hour; her trial speed 14.354 knots. The speed of the *Resistance* and her consort is 11.356 knots per hour.

The British are now building the following seventeen iron-clads. This list we take from *Mitchell's Steam Shipping Journal*—

The *Prince Albert*, cupola ship, of twelve guns, 4,045 tons, and 1,000-horse power; the *Minotaur*, fifty guns, 6,621 tons, 1,250-horse power; the *Tamar*, troop-ship, three guns, 2,812 tons, 500-horse power; the *Orontes*, of similar dimensions, and for similar service; the *Northumberland*, fifty guns, 6,621 tons, 1,250-horse power; the *Valiant*, thirty-two guns, 4,063 tons, 800-horse power; the *Caledonia*, thirty-two guns, 4,045 tons, 800-horse power; the *Enterprise* and *Circassian*, sloops of 990 tons and 160-horse power; the *Favourite*, corvette, 1,857 tons, 400-horse power; the *Royal Oak*, fifty guns, 4,045 tons, 800-horse power; the *Achilles*, fifty guns, 6,079 tons, 1,250-horse power; the *Hector*, thirty-two guns, 4,063 tons, 800-horse power; the *Ocean*, fifty guns, 5,045 tons, 1,000-horse power; the *Prince Consort*, fifty guns, 4,045 tons, 800-horse power; the *Zealous*, sixteen guns, 3,716 tons, 800-horse power; and the *Agincourt*, 6,650 tons, and 1,320-horse power.

With the four afloat, this comprises a list of twenty-three armor-clads. Four of these will be larger than the *Warrior*, and will be plated from stem to stern with 5½-inch plates. The *Hector* we learn has been launched at Glasgow since the above was published. She is 286 feet in length, and fifty-six feet in breadth. She is to be plated from stem to

stern with 4½-inch plates. Her cost will be \$875,000, at the rate of five dollars per pound sterling. The *Prince Albert* and *Royal Oak* have also been launched, and it is expected they will be finished this year. It is intended that their speed will not be less at sea than eleven and a-half knots per hour. We have thus presented the number of the French and English armor vessels that have been built or that are now being constructed.

In size and power the French fleet will be far inferior to that of Great Britain. Mr. McKay states that the opinions of practical men in Europe are unfavorable to shield or turret ships. A number of the frigates mentioned are being converted into iron-clads from first-class wooden line-of-battle ships. Besides all these vessels, Mr. McKay says:—

There are two other classes of ships building on plans of Mr. Reed, naval architect, who got a temporary appointment in the navy. The characteristics of these ships are that they are only plated a little above and below the load-line and the midship part of the vessel containing the guns. The object of the design is to relieve the ends of his vessels of weight, and so far his plans agree with those I proposed to our Navy Department eighteen months ago—but in vain. Here the plan has found great favor with the Admiralty, and a great number of thirty-six gun frigates are to be transformed into iron-cased sloops on this plan.

Omitting many details of description connected with these foreign vessels, we give the concluding and more important views of Mr. McKay, nearly in full, as follows:—

The French can have by the end of next year a fleet of sixteen iron-cased frigates fit for foreign service, and the English can muster in a year and a-half sixteen iron-cased frigates and two iron-cased corvettes, all fit foreign service and for an aggressive warfare.

If we compare with these immense fleets the iron-cased navy of the United States, impartially, we have to acknowledge that in case of a war with either of the above Powers, we would have to keep entirely on the defensive, to submit to a disgraceful blockade, and to leave our merchant ships all over the globe to the mercy of our enemy. All the *Monitors* which we are building by the dozen are very well to defend our harbors, but they are entirely unfit to break a blockade or to act on the high seas, for to say that these vessels are good sea-boats, or suitable for men to live in, is simply ridiculous, in which statement I will be upheld by all experienced sailors and shipbuilders of any note.

With their very light draught of water these *Monitors* never can obtain a high degree of speed, and if ever they should fall in with any of the large frigates in deep water they will be terribly handled, and in all probability run down. Do not think that this could not be done because the *Merrimac* failed in her attempt to run down the *Monitor*. She struck with a speed of three or four knots or even not as much as that, but a mass of 6 to 9,000 tons in weight, driven at a speed of twelve to fourteen knots would give a different result.

Of all the iron-cased ships which we have, the only one that might successfully cope with the large English frigates is the *Ironsides*, built in Philadelphia. She is well planned, and her practical construction very well executed, but her speed is too low to use the good points of the vessel to advantage, and the way of fastening her plates will not stand the test of a heavy cannonade, for in the experiments made in England with armor plates, similarly fastened by screw bolts screwed in from the inside, the bolts broke off short on the inside of the plate whenever a heavy shot struck the plate near such bolts.

It is satisfactory to know that Mr. Webb has got a contract for building an iron-cased ship according to his own plans. He certainly will produce something able to compete with any European frigate.

Now to be compelled to keep on the defensive (in itself a defeat) in case of a war with any of the great naval powers, it is absolutely necessary that we should have at least twenty large, powerful iron-cased frigates, that can be used also as rams, of at least twelve knots speed, capable to carry ten days' coal, and not exceeding a draught of water of twenty-four feet. With less draught it is impossible to impart to such large ships the above high speed.

Mr. McKay does not like iron ships; he prefers wooden ships simply covered with plates. On this head he says:—

They ought to be built of wood that they can be coppered, thus avoiding loss of speed on account of the fouling of the bottom. In case of these ships striking, a wooden bottom never is injured in a like manner as an iron one invariably is, and besides the wooden frame affords a much better backing to the armor plates than ever can be afforded in a ship built entirely of iron.

He mentions the case of the *Resistance*, the bottom of which was found covered with barnacles, after she had been lying at Portsmouth for a very short period. Mr. McKay asserts that far stronger wooden vessels can be built in America than Europe, because thick oak planking of from forty to sixty feet in length can be obtained in abundance in Delaware and Ohio, and no where else on the globe. He concludes his communication as follows:—

In addition to the above frigates, we ought to have at least twenty to thirty fast iron-cased shell-proof corvettes, of about ten to twelve heavy guns each, and of a moderate draught of water, with high speed.

With such a fleet we can uphold the honor of our flag, and meet any fleet that can be brought against us.

For the service in foreign countries, to protect the commerce of our own country and to harass that of the enemy, we ought to have about twenty to thirty 50-gun frigates, not cased—and as many sloops, of fourteen to twenty-four guns, of the highest speed obtainable, so that they may be enabled to strike unexpected blows and to evade their iron-cased adversaries, which never will obtain the same high speed at sea as can be given to them.

In my opinion, wooden ships (uncased) will never be entirely done away with. The same opinion is fast gaining ground in Europe, and our own present war has offered us hundreds of examples how effectively wooden ships can be used in warfare, notwithstanding the destructive effects of modern artillery. No time should be lost by our Government in creating a powerful fleet, fit to cruise in all the seas of the globe.

With such quantities of the most superior iron in the world as Pennsylvania affords, with such facility, and pasture white oak, also superior in quality, dimension and durability, to that of any other nation, combining these with the highest talent which we undoubtedly possess, we should not close our labors until we have constructed the most powerful navy in the world. Then, and not till then, shall we be respected by all nations.

## VALUABLE RECEIPTS.

BLACK WRITING INK.—Notwithstanding the great number of receipts for making ink which are to be found in various publications, it is a fact that very great quantities of the inks which are sold resemble black slush. After standing a few days they leave a deposit in the bottle as thick as molasses. In this and future numbers of the *SCIENTIFIC AMERICAN* we will give a series of receipts for making inks of various colors, and we commence with Ribancourt's French ink. It is prepared as follows:—Take Aleppo galls in coarse powder, 8 ounces; logwood chips, 4 ounces; sulphate of iron, 4 ounces; powdered gum arabic, 3 ounces; sulphate of copper, 1 ounce; crystallized sugar, 1 ounce. The galls and logwood are boiled together in one gallon of water until half of the water has been evaporated; the decoction is then strained through a hair sieve, and the other ingredients added and stirred until they are all dissolved. It is then allowed to rest for 24 hours, when it may be bottled up for future use. The editor of the *London Chemical News* states that the following receipt has been furnished by a correspondent who states that good writing fluid may be made as directed:—Triturate in a mortar 36 grains of gallic acid with 3½ ounces of a strong decoction of logwood, and put it into an 8-ounce bottle together with 1 ounce of ammonia. Dissolve 1 ounce of the sulphate of iron in half an ounce of warm water, then mix the solutions together by agitating them for a few minutes. It is stated that a clear ink may thus be formed which will keep a considerable length of time without becoming thick or growing moldy. It must not be mixed with any common ink.