THE EVOLUTION OF A BATTLE-SHIP.

THERE was general surprise when in less than one month after the launch of the first modern American battle-ship, Mr. Tracy, ex-Secretary of the Navy, announced that the United States was entitled to rank fifth among the naval powers of the world. The announcement was made a year ago last March at a dinner given in Brooklyn in honor of himself and of his successor, Mr. Herbert. Mr. Tracy spoke as a naval expert merely, but had he dwelt upon the full significance of his declaration, the surprise would have been much greater. He and Mr. Herbert, in the presence of a distinguished company, which included the President of the United States, had witnessed only a few days before, at the Cramp shipyard in Philadelphia, the launch of the *Indiana*, one of three sister battle-ships now building in this country, so complete in all their details, and so equipped with powers of almost inconceivable destruction, that, although they are to be twenty-five per cent. smaller than the great battle-ships now being finished in England, and therefore that much less of a target, they are acknowledged by naval experts here and abroad to be superior to any engine of war yet constructed. Mr. Tracy might have added interest to his statement, had he said that in the Cramp shipyard alone there was at that time $32,000,000 worth of ship-building under contract, an amount not only greater than has ever been known in one establishment in the history of this country, but larger, so far as is known, than has ever been under contract at one time in any shipyard in the world. As a direct result of the encouragement of naval ship-building, Mr. Tracy might have declared that of this $32,000,000 of work, $11,000,000 is for the revival of the American merchant marine, to be spent on the construction, not of mediocre vessels, but of four splendid craft, destined to rival the best creations of foreign design and workmanship. He might have pointed out that the remaining $21-000,000 is to be used in building seven enormous men-of-war not only equal to any of their grades in other navies, but surpassing them one by one in finish and capabilities. Mr. Tracy might have gone still further, and referred to the fact that in San Francisco, in Boston, in Bath, in Baltimore, in Dubuque, are splendid plants not only engaged in building naval vessels, some of them counterparts of those under construction at Cramp's, but capable of constructing merchantmen of high grade. He might also have declared that scores of ship-builders on the great lakes have felt the impulse of this enormous revival of American shipping, and that into the construction of steel vessels, which in this country to-day may be estimated, at a low figure, at $50,000,000, there are entering new ideas which mean greater efficiency in speed and carrying capacity.

To be the fifth naval power of the world, therefore, means vastly more than the ability to fight, to cripple, to destroy, or to subjugate the fleet of some other nation. It means the encouragement of a great variety of industries of vast scope. It means greater achievements in mastering the forces of nature, and best, perhaps, of all, it means greater scientific attainment; for such is the legitimate work of a navy in time of peace. It means more knowledge of wind and wave currents, more study of astronomical phenomena, more explorations, more mapping of coasts, more extension of civilization, more growth of commerce. Finally, it means much for the preservation of peace, and the consequent development of human progress.

It is not difficult to account for the great popularity of the new navy. It can best be explained by saying that the new navy is the most stirring embodiment of what has been called the National Idea. It is something concrete. It has life. It has the power of science grown to full manhood, and rejoicing in its strength, easily provoked to anger, and more terrible in its wrath than the powers that mythology ascribed to the gods of its creation. Any intelligent person can easily appreciate the idea of patriotism in the abstract. It is that which makes the American raise the flag on his house-top or in his yard on the Fourth of July, or which causes an Englishman to raise his hat when "God Save the Queen" is played. But how much more vigorous is the patriotic impulse when it finds something living to exult over, and to be proud of! Those who saw that remarkable scene nine years ago, when Jefferson Davis, ex-president of the Southern Confederacy, unforgiven and unforgiving, but himself the son, as he said proudly, of a Revolutionary soldier, came from his humble Mississippi home down to the railroad track, there to bare his head, and to bow to and apostrophize the Liberty

Bell from Independence Hall on its way to the New Orleans Exposition, can understand what sentiment in the concrete means. Those who saw the tokens of affection bestowed on that same bit of metal on its recent journey to Chicago may easily understand why a man-of-war, gleaming white in the sun, swan-like in its graceful curves, but endowed with devastation, and breathing fire from its nostrils, thrills the citizen of a country where every man is an equal partner in its possession.

To build a battle-ship is of itself a mighty achievement for any country, but to build one better than any other nation is building, and that in face of the fact that only six years ago we had no plants capable of making shafts, armor, or gun-forgings, and none of the mighty tools required in this work, is surely a triumph. American steel, our experts assert, is superior to that made abroad. Certainly American workmanship is more finished, and, ship by ship, we have beaten the world ever since we began turning out our commerce-destroying cruisers like the *Baltimore*, *Philadelphia*, *Newark*, and *San Francisco*, that average in cost more than $1,250,000, look so formidable, and were the objects of so much pride at the naval review last year, but of which the sides would offer little more resistance to even the smallest rapid-fire guns of an enemy than so much pasteboard. These vessels have cost from twenty to twenty-five per cent. more than similar vessels of other nations, but there can be no question that they are that much more effective.

It is worth while to consider what a battle-ship like the *Indiana* really is. In the first place, the cost approximates $3,500,000, or only $250,000 less than the sum this Government, under the wise policy of Thomas Jefferson, paid for the entire Louisiana purchase, with its immense territory. This sum is almost exactly one half of what Alaska cost this government, and a little more than one quarter of what England paid to this country as the result of the *Alabama* arbitration. Surely a craft like this is a stupendous bit of machinery. Like all other steel or iron vessels, a battle-ship is a matter of frames, plates, and rivets, put together after most skilful planning and much hammering. It is constructed with due regard to that mathematical quality known as specific gravity, but which the layman can best understand by the word steadiness. It is a delicate adjustment of curves of solid steel to the changeable resistance of waves of air and water. It is as much superior to the ordinary vessel, and as much more complicated, as an opera is to an ordinary hymn-tune. It is simply packed with machinery. Unlike the merchantman, speed is not the thing most desired. The battle-ship *Indiana* when finished will weigh 10,296 tons. This is within 200 tons of the gross register of the well-known American liner, the *Paris*, but the *Indiana* will be four knots an hour slower, will be 179 feet shorter, six feet broader, and will draw two feet more water. Of these 10,296 tons of her displacement 4,400 tons will be of magnificent steel for the hull. The armor, rolled and toughened until it is the best in the world, some of it eighteen inches thick, will weigh 2700 tons. The engines and machinery, acknowledged to be superior to those constructed abroad, will weigh 875 tons, and the rest of the weight will consist of armament, coal, and stores. In putting all this together about 700 tons of rivets are used. For the hull alone 25 principal plans must be made, and fully 400 separate drawings must be prepared, and duplicated by photograph. This of itself is enough work to keep a force of expert draftsmen busy continuously for eight months. For the engines more than 250 separate drawings are required, and these, in all their delicate details, would take a force of fifty men nearly a year to complete, if engaged continuously at the task. The preparation of plans continues as the vessel is building, and does not cease until almost the very day she goes into commission. Not only must every rivet, every joint, be marked out and noted, but there must be the most complicated computation of strains and weights. Space must be economized in every way, and the interior fittings, and the machinery with its two main engines and four tremendous boilers, through any of which a horse car might almost be driven, must not only be so placed as to do the best work as quickly as possible, but also so as to preserve the equilibrium of the ship. Here, then, is a fascinating problem, to the solution of which marine engineers must apply complexities of mathematical formulæ such as would bewilder the brain of an ordinary civil engineer. Except for the belt of armor along its sides and on its turrets and conning-tower, the steel plates of the ship are only five eighths of an inch thick, made to keep out water rather than projectiles. A ship like this has one large military mast, a steel tower ninety feet tall, protruding at intervals through saucer-like receptacles called "fighting-tops" and extending above the uppermost one like an old-fashioned candlestick from its standard. The vessel's two elliptical smoke-stacks have 16 feet of diameter the broadest way across. Inside of this vessel are 66 separate engines. Each of the two main engines is so tremendous that, tucked away under its arms, as its frames reach up two or three stories high, are two little engines, the sole purpose of which is to start the big ones going. The condensing-tubes of this craft alone would make a single tube nearly 12 miles long. It takes 30 tons of water to fill her boilers full before steam is generated. The

boilers, about 16 feet in diameter, and 20 feet long, must stand a pressure of 160 pounds to the square inch. Mile upon mile of tubing is used in them, and numerous engines for pumping, for ventilation, for steering, are scattered through the hold. Three immense dynamos, each of 300 amperes' capacity, are used in the ship — an electric plant that could light up a town of 5000 inhabitants. Twenty-one sets of speaking-tubes run throughout the vessel, and center at 12 telephone stations. Electric call-bells, automatic signals, registering-devices of various sorts, add to the complication of the details. Clad with 19 inches of steel are two turrets, one fore and one aft, in each of which are two big 13-inch guns. Each of these guns weighs 61 tons, and is 49 feet long. Far down beneath the turrets are the two main magazines, where ton upon ton of powder and ball made into projectiles, some of which weigh 1100 pounds each, is stored. These magazines are steel-clad rooms, and are lighted by electric lights sunk into glass wells in the corners of each room. They are fitted with little thermometers that ring a fire-alarm when the mercury reaches a certain height. They have also a system of tubes through which a flood of water may be poured in time of danger. One story above the four 13-inch guns on the main deck are eight 8-inch guns, on a superstructure, in sets of twos, and bunched about the smoke-stacks. Amidships, on the main deck, are four 6-inch guns, crowded still closer together. Subordinate to all these, and peeping from various open nooks and crevices, are 26 smaller weapons, with long needle-like barrels, called rapid-fire guns, each capable of firing projectiles of chilled steel weighing from one to three pounds at the rate of fifteen shots a minute. Around on the superstructure are arranged 14 boats, steam launches, whale-boats, gigs, and one electric launch. Down in the water, at the end of the shafts that project from each side of the flanks, are two screws to propel the ship, and at the bow, curving only a few feet under the water like a protruding chin, not too pronounced to be ungainly, is the ram, a single steel-casting, so buttressed and strengthened that with sufficient momentum it could cut steel armor like a knife.

But not until a battle-ship is endowed with life, and not until we see what it can do, may we appreciate fully what it is. It is its power that appals us. Perhaps the best definition of a battle-ship is that it is a fort of toughened steel under and around which a boat has been built. In other words, it is a floating fortress. It is meant to fight, and never to run away. When Mr. Tracy decided to build these modern battle-ships, he summoned Lieutenant Lewis Nixon, now the superintending constructor at Cramp's yard, then under 30 years of age, and told him to make a crude design for such a craft as he had indicated. At that time no vessel larger than 7500 tons had been launched in this country. Proceeding upon an 8500-ton basis, Mr. Nixon built a steel fort, put as heavy guns in it and on it as he could with safety, and then calculated the dimensions of the boat on which it must float. After Mr. Tracy looked at the figures, and listened to the explanation of them, he thrust them aside with this remark:

"I don't know much about these details and dimensions. What I want to know is whether, if you let all these guns go off at once, they would beat the delivery of the guns on those battle-ships the English and French are building."

"They would not, I am sorry to say," replied the young constructor.

"Go back and make them do it," said the Secretary.

Mr. Nixon went back and added 1000 tons to the displacement of the vessel, and in a day or two sought the Secretary.

"Now will they beat those foreign boats?" asked the Secretary.

"Well," said the constructor, "I am afraid they won't beat them; but they'll nearly do so."

"Go back and make them do it," said the Secretary again; adding, "We can launch just as big boats as any one else."

Mr. Nixon went back, and the third time hit the mark, producing plans for a 10,300-ton vessel such as the *Indiana*. That he did successfully what he was ordered to is shown by the fact that the main batteries of the English battle-ships *Victoria* (sunk last year in the Mediterranean) and *Royal Sovereign* are planned to hurl 6000 pounds of metal at a single discharge, while the *Indiana*, of nearly 4000 tons' less displacement, and drawing 3 feet less of water, hurls 6800 pounds of metal at a single discharge of her main batteries.

The steel fort that Mr. Nixon planned is 190 feet long, 7½ feet deep, and 18 inches thick. At each end a barbette rises to protect the monster 13-inch guns. These barbettes are 35 feet in diameter, 17 inches thick, and 12 feet high. Built around this fort, and with its smoke-stacks, conning-tower, and military mast rising above it from the inside of the steel fortress, is a sturdy craft which may be entirely shot away at the ends, and is 348 feet long, 69 feet broad, and 24 feet deep. Its speed was to be 16 knots an hour, and its steam power that of 10,000 horses.

One can only conjecture what damage its guns can do. We know that one of these 13-inch guns, hurling an 100-pound projectile at a velocity of certainly 2000 feet a second, will pierce 30 inches of wrought iron at its muzzle, and probably 25 inches of the same material a mile away. We know that such a gun would throw its projectile with accuracy a distance

of 12 miles. The 8-inch guns would throw projectiles of 250 pounds' weight effectively eight miles. The 6-inch guns would fire with certainty a distance of six miles, and all the smaller weapons might be used at distances up to two and a half miles. In ten minutes, by using all the guns at their full powers, each 13-inch gun firing once in two minutes, and some of the rapid-fire guns once in every four seconds, the *Indiana* could fire about 60 tons of metal. In an engagement where her main batteries could be in constant use, with only part of her second battery, she would hurl, in ten minutes, from 15 to 18 tons of projectiles, each going with a velocity of, say, 2000 feet a second, and weighing from 1 pound up to 1100 pounds. When one thinks of this appalling power, and realizes that after these missiles have landed their work has only just begun,— for they are arranged to burst, and some of them to send forth noxious gases, poisoning every one within their reach,— the capabilities of destruction pass beyond comprehension. Added to all this is the ability to keep up the bombardment at this speed for between four and five hours. In the magazines will be stored 1095 tons of ammunition. For the 13-inch guns there will be 400 shells, each 66 inches long, the height of the average man, and each weighing 1100 pounds. There will also be 800 half-charges, 45 inches long. There will be 800 charges, each weighing 250 pounds, for the 8-inch guns; 400 charges, each weighing 100 pounds, for the 6-inch guns; 800 charges for the 6-pound rapid-firing guns; 40,000 charges for the Gatling guns, and 150,000 charges for the other rifles. Figures such as these, even if used about so many bricks, would be startling.

The power of the smaller of these breech-loading rifle-gun had an illustration in the recent Chilean civil war. A shot weighing 250 pounds from an 8-inch gun of Fort Valdivia in Valparaiso harbor struck the cruiser *Blanco Encalada* above the armor belt, passed through the thin steel plate on the side, went through the captain's cabin, took the pillow from under his head, dropped his head on the mattress with a thump, but without injuring a hair, passed through the open door into the mess-room, where it struck the floor, and then glanced to the ceiling. Then it went through a wooden bulkhead one inch thick into a room 25 by 42 feet where forty men were sleeping in hammocks. It killed six of them outright, and wounded six others, three of whom died, after which it passed through a steel bulkhead five inches thick, and ended its course by striking a battery outside, in which it made a dent nearly two inches deep. It was filled with sand. Had it released deadly gases no one knows what damage it might have done. A 450-pound missile from a 10-inch gun in the same fort struck the same vessel on its 8-inch armor. It hit square on a bolt. The shell did not pierce the armor, but burst outside the vessel. It drove the bolt clear through, and in its flight the bolt struck an 8-inch gun, completely disabling it. Such is the power of the smaller-sized guns.

But we have not exhausted the power of the *Indiana*. Under nearly an acre of heating surface the boilers have been generating a force of steam that pushes the vessel fiercely through the water, and the ram becomes a terrible weapon. Mr. Nixon has calculated roughly that if the *Indiana* were driven at full force against a stationary object, such as one of the Brooklyn Bridge towers, she would strike with a force of 100,000 foot tons, that is, a force that could lift 100,000 tons one foot. The writer leaves it to engineers of much leisure and large mental endowments to calculate what the effect of such a blow would be on the tower or on the boat. He knows one man who would not like to take his chances on the bridge. Certainly no vessel struck by such a blow could live. In addition to all this, remember that with her four powerful search-lights for eyes this terrible craft has the power of discerning small boats, mere specks on the water, at a distance of one to three miles in the night, and she becomes a monster for the imagination to deal with. The wonder is, not that it costs $3,500,000 to build her, but that it does not cost five times that much. Truly such a vessel may be termed the highest mechanical achievement of man, far surpassing any bridge or building in its complexities and in its capabilities. From beneath the earth man has torn its steel and dug its fire, and has constructed a machine that not only defies air and water, but, guided by human intelligence, asserts its mastery over them with a mocking, shrieking power that one can imagine to have been borrowed only from the noises and forces of chaos.

It is worth while to look about a place that produces such a monster. The Cramp shipyard has nearly a quarter of a mile of water-front. Along this frontage are ships in various stages of construction, some on the stocks and some in the water, illustrating almost every step in the building of a vessel. Here, near the entrance to the yard, is an acre or more of punching-machines, enormous contrivances that, as they close their jaws, with their ungainly teeth bite out holes for rivets in the plates and frames as easily as a farmer's wife takes out the core of an apple. Over there is a steel checker-board frame into which big pins are set in a curve. Against the pins stalwart sledge-swingers, half naked, bend the cherry-red frames and plates, as they are slid out of the furnace, into the shapes they must assume for use in the vessels. Here is a great

row of blacksmith forges. Over there is a building where a dozen monster boilers are in construction, and where a traveling crane lifts and moves them as easily as a hotel porter does big trunks. Here are big ship-engines, some set up and some taken down. Here are foundries where manganese-bronze screws are cast, and where brass and iron are fashioned into a thousand forms. Here is the great mold-loft where every line in the ship is laid down, and from which wooden counterparts of the vessels are made before the steel construction begins. Here are the wood-working shops, the gun factory, the great store-house, and there is the floating derrick that can pick up a 70-ton boiler, move it 300 feet, lift it high in the air, and place it in a ship in thirty minutes, with as careful an adjustment as a watchmaker uses in fitting a movement in its place. And here are 5000 men employed in various capacities — machinists, wood-workers, molders, and perhaps most noticeable of all, riveters in sets of three, one man to hold a big sledge against the red-hot rivet, and two, one a right-handed worker and the other left-handed, to pound it until it becomes a part of the ship. So the work goes on until after about two years the ship that existed only in specifications becomes a living thing.

In putting this ship together the same methods are used as in a merchantman. The keel is first laid on big blocks, arranged at intervals of about three feet, on an incline of about five eighths of an inch to a foot, so as to give the requisite pitch in launching. The *Paris* had an incline of half an inch to the foot, but for the battle-ships, which are shorter and nearly as heavy, a steeper incline is required. After the keel is laid the two frames in the center of the boat are put up, and then others fore and aft follow until the stern-post and ram are fixed into place. The plates on the sides are riveted on, and it is not until the hull is half finished that we notice a radical difference between it and the hull of the merchantman. Then we catch the first glimpse of the protective deck. This is a turtle-back of steel from three to four inches thick reaching from side to side, and in most naval vessels from bow to stern. At the sides it extends about three feet below the water line. Below this deck are the engines, boilers, and a spare steering-apparatus. If a shot could get through the sides of the vessel it might kill men,— that is to be expected in warfare,— but it must pass through this sloping inner deck of steel before it can disable the vital parts of the vessel. It is this protective deck that makes valuable the cruisers that at present constitute the main strength of our navy. A shot might go through their pasteboard sides easily, but it would be a long time before the engines would be disabled in an engagement. It is on this protective deck that the steel fort of the *Indiana* rests. From the ends of the redoubt this protective deck runs fore and aft, to bow and stern, and if all this frail part of the vessel were shot away, the ship could still float and fight.

So the building goes on until the launching day comes, and two broad ways are built up against the bottom of the vessel, and the keel-blocks on which it has been resting are knocked away. In the launch of the *Indiana* Mr. Nixon ran a row of electric lights beneath the bottom of the vessel, adding another innovation to the details of American ship-building. Each launching way consists of upper and lower planking, between which is spread thousands of pounds of the best tallow. At the bow of the boat these upper and lower planks are clamped together, and when all is ready they are sawed apart, and the vessel starts. The upper part of the ways slides into the water with the vessel, and the lower part with the smoking hot tallow remains stationary. A launch in these days is so smooth, and so soon ended, rarely occupying more than twelve seconds from start to finish, that one scarcely realizes its difficulties. Three things are absolutely necessary: it must be on time, when the tidal water is highest; it must be of smart speed, so as not to stick on its downward journey to the water; and it must be accomplished without straining. So complex a thing is a launch that the careful engineer-in-charge is able to estimate the strain on every part of the vessel for every position it occupies, at intervals of one foot, on its way down the incline. There is one supreme moment. It is when the vessel is nearly two thirds in the water. The buoyancy of the water raises the vessel, and throws its weight on its shoulders. Here is where the greatest danger of straining comes, and should the ways break down, the vessel would be ruined, a matter of nearly $2,000,000 in a ship like the *Indiana* when it was launched.

The launch over, the machinery is lifted in and fitted, and then comes the board of government experts, who look the vessel over inch by inch, the fires are started, and the trial trip follows. For four hours, amid suppressed excitement that answers nervously to every quiver of the vessel, the engines are run at full speed. A premium or a penalty is at stake now. The breakage of a bolt or the disarrangement of a valve may mean thousands of dollars of loss to the contractors. Trained workmen are locked in the fire-rooms, not to be released until the test is over. Cooled drinking-water with oatmeal sprinkled upon it is run down to them in a rubber tube from a barrel on the deck. A hose is played on the costly machinery in places where there is danger from overheating, as though it were on fire. Almost every pound of coal used on the trip is carefully selected.

When the four hours are passed and the strain is over, a sigh of relief from every one on board, and even from the vessel herself, goes up, and the ship passes from the contractor to the Government, and day after day while she is in commission the flag will be saluted, and the score or more of other ceremonies and formalities observed on a man-of-war will follow.

Such is the evolution of a battle-ship in these days. It is thirty-one years since the first American, armor-clad, sea-going battle-ship, the *New Ironsides*, was finished. That, too, was built at Cramp's yard. The monitors were not sea-going fighters, and may better be termed harbor defenders. But what a contrast between the *New Ironsides*, that splendid fighter of the civil war, and the *Indiana!* Within seven months after the contract was signed the *New Ironsides* was steaming to Charleston. Splendid white oak timbers were used in her construction. There were 120 timbers in it, each 38 feet long, 22 inches wide, and 14 inches thick, all cut within 25 miles of Philadelphia in the middle of winter, and after the contract was signed. No white oak for ship-building may be found there now, but the iron mines and the forges and the furnaces have taken its place. The *New Ironsides* had a slightly sloping armor of 4 inches of wrought-iron on her sides, and the armor served her well. The vessel was of 3580 tons' displacement, had a speed of 10 knots, was 255 feet long, 56 feet broad, 14 feet deep, carried 16 11-inch Dahlgren guns, and 2 100-pounder Parrott guns. Under the *Indiana's* 6-inch guns this vessel, majestic and stately as she was, would not last fifteen minutes, and her heaviest guns would scarcely dent the armor of the *Indiana*.

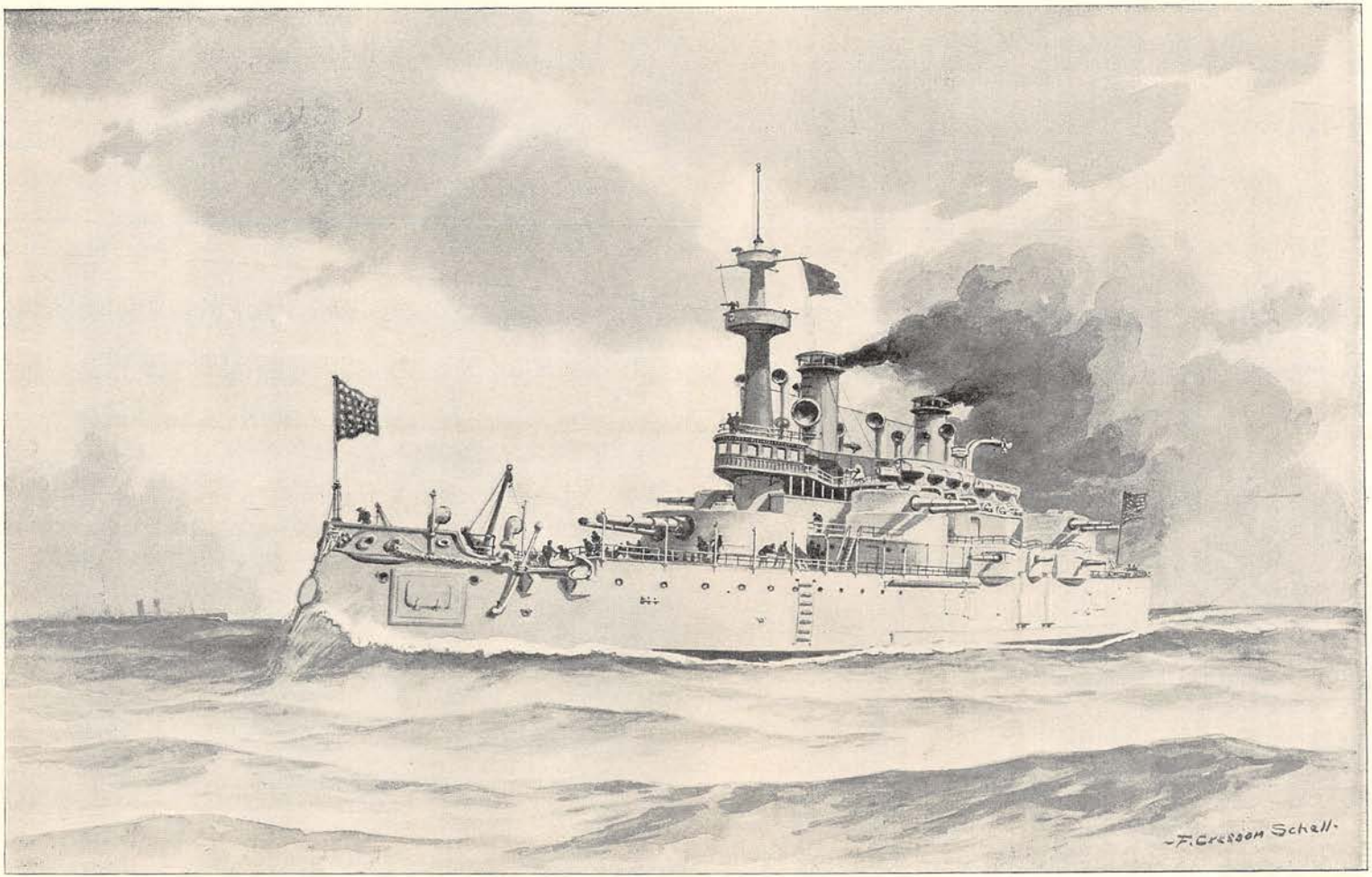
When the *Indiana* sails down the Delaware in commission, she will be the ninety-second man-of-war built for the United States navy on the Delaware. The list begins in 1776 with the good ship *Randolph*, armed with 32 guns, which in 1778 blew up at sea, 311 men perishing with her. That and three others were built by Joshua Humphreys, a far-seeing ship-constructor, who set forth a rule of practice that obtains to-day, that, inasmuch as our vessels must be inferior in numbers to those of European navies, they must always be better fighters, and, ship by ship, improve on those built across the sea. The list of the 92 vessels includes the *Guerrière* and the *Franklin*, and the great ship-of-the-line *Pennsylvania*, launched in 1837, a wonder in her time. Further on in the list is the steamer *Mississippi*, the second of the steam war-vessels built on the Delaware. This was the vessel that took Kossuth from Turkey to France, and brought his comrades in exile to this country. It was Commodore Perry's flag-ship in the Mexican war, and it was from her decks, in his expedition to Japan, that Perry made his successful demand for admission to the ports of that country.

Worthy successors to all these will be the *Indiana* and her sister ships, the *Massachusetts* and the *Oregon*. It will doubtless satisfy the ardent spirit of patriotism that always demands advance to know that the battle-ship *Iowa*, which also is under contract at Cramp's, and which will probably be the ninety-fourth vessel in the list of Delaware-built war-ships for the United States, will surpass the *Indiana* as much as the *Indiana* surpasses foreign-built battle-ships. The *Iowa* will be king rather than queen of the seas.

And as all these vessels leave the various ship-yards of the country to take their places in its fleet, adding by their numbers to the moral strength of the country, increasing its dignity and influence among the nations of the earth, so long as force and brute strength shall continue to be signs of a nation's sovereignty, what do they leave behind? They leave magnificent ship-building plants which are ready and eager to build an American merchant marine — nay, have already begun to build it; vessels that shall be the sign of commercial and internal prosperity. During our civil war England scattered the contracts for her new iron ships among as many private yards as possible. The result was that by wise legislation in favor of shipping interests every advantage was taken of her opportunities, and her splendid merchant marine sprang into existence almost like magic. Here was an industry fostered not by protective laws, but by alert business strategy. When we consider that in letting their contracts for the steel for the new American Line vessels that the Messrs. Cramp are building, they secured the material cheaper than they could have imported it duty-free from England, ship-building in this country takes on a most serious and pleasing aspect. With the repeal of present legislation discriminating against this industry, what may we not look forward to? We have the plants and the tools, the workmen and the designers.

When we thus consider the scope of the new navy and its meaning, the possibilities of the situation appeal not only to our love of country, but to our commercial common sense. To use, perhaps, an ugly figure of speech, we may say, in a spirit of not over-confidential anticipation, that this new navy of ours is intended to be, and we may express the hope that it soon will be, simply the advance guard of police, the body of force and authority, clearing a path on the highway of nations for the procession of peace that is sure to follow.

Albert Franklin Matthews.



THE BATTLE-SHIP "INDIANA."