

# Building a Battleship

**How a floating fortress is put together**

**P**ASSING in recent review under the scrutiny of President Roosevelt and a curious battery of eyes, a dozen grim steel fortresses, flanked by as many more armored and protected cruisers, made the greatest muster of American warships ever simultaneously congregated. They were the battleships Maine, Kearsarge, Kentucky, Missouri, Alabama, Illinois, Iowa, Massachusetts, New Jersey, Rhode Island, Virginia and Georgia, the last four in the duodenary array being the most recent additions to the greater American navy.

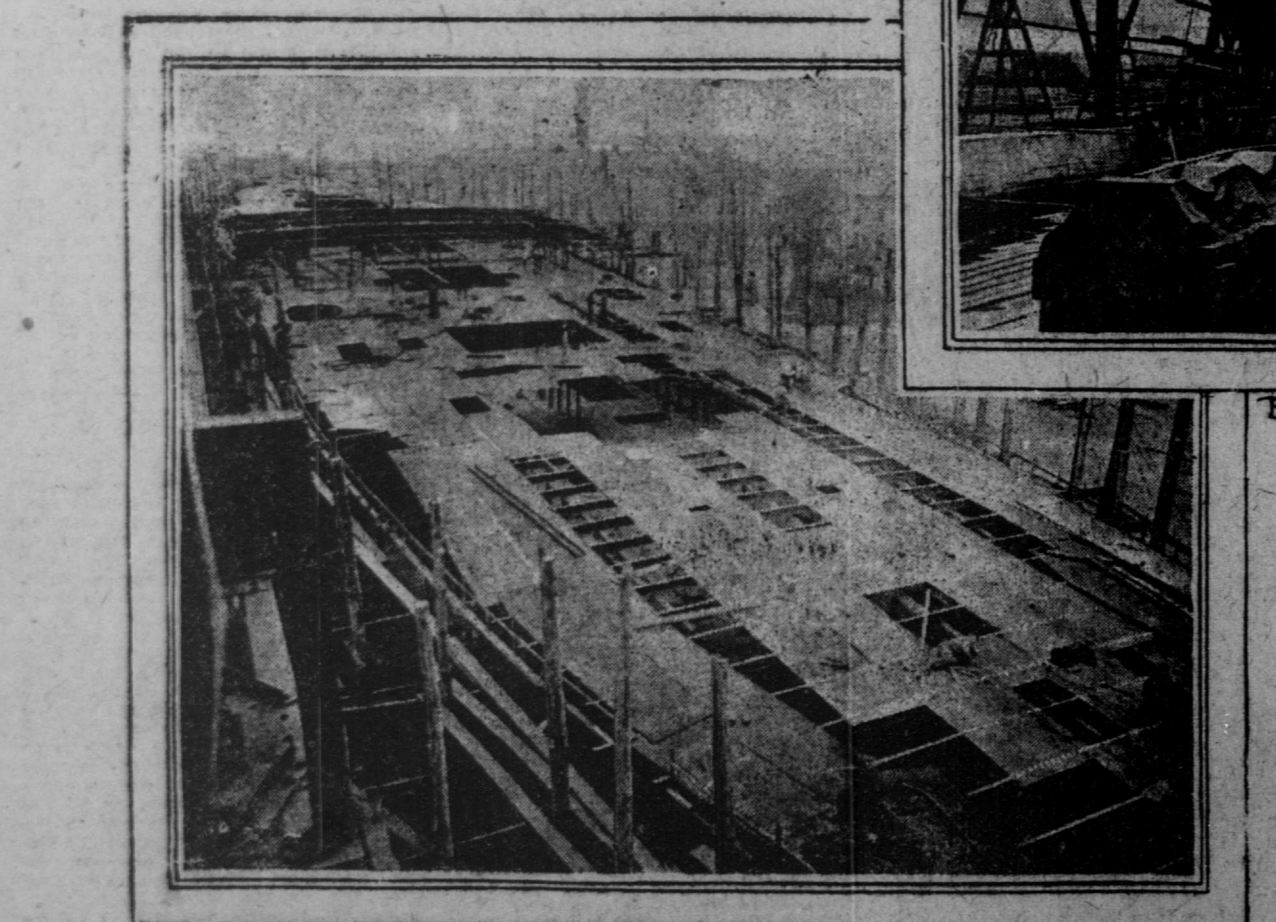
The formidable armada carried more than 70,000 men and is costing the American people \$6,000,000 a year for maintenance. As they maneuvered off Oyster Bay those dozen battleships alone weighed approximately 175,000 tons, carried nearly 15,000 tons of fuel, had a combined steam energy of more than 120,000 horsepower and contained perhaps 5000 miles of electric wires operating at least 1200 motors and somewhere around 5000 lights.

There were guns in those fabled steel turrets, resting like monsters on their massive haunches, capable of hurling half a ton of armor-piercing steel twice a minute and hitting a target three miles away every time with the vessel steaming at more than half speed. There was nearly a square mile of 9, 12 and 17 inch armor plate scaling those burly amphibians of war—burly, yet obedient to the command as a loyal legion. They represented an aggregate of sixty million dollars in value—those twelve engines of exact science, crowded with steam and electric apparatus, with great gun turrets and chasebox turrets, swung by electricity from side to side in forty seconds; telescope sights, electric ammunition hoists and gun crews keyed physically to fighting pitch with special muscles developed in each gunner by daily and precise practice.

With the disappearance of the motive power from masts and sails there has come a pressing necessity for men of superior intelligence and greater mental schooling. The romance and pic-

ture of the maneuvering of the mighty vessel by a finger touch, the swinging of heavy turrets and guns by the movement of tiny switches, the multiplication of signal systems until ship can talk with ship by day or night with astonishing swiftness and accuracy—the searchlights, the sounding and thermal apparatus, the ice machines, the wireless telegraphy, the monster twin engines and batteries of boilers, the endless hydraulic driven machines, and so on.

All this appears formidable, as a matter of simple comprehension, and it is a somewhat bewildering catalogue, yet not nearly so complex in its simplicity as the organism of the human body. Past masters of surgery agree that for complex simplicity the human body has no rival, but it may be ven-

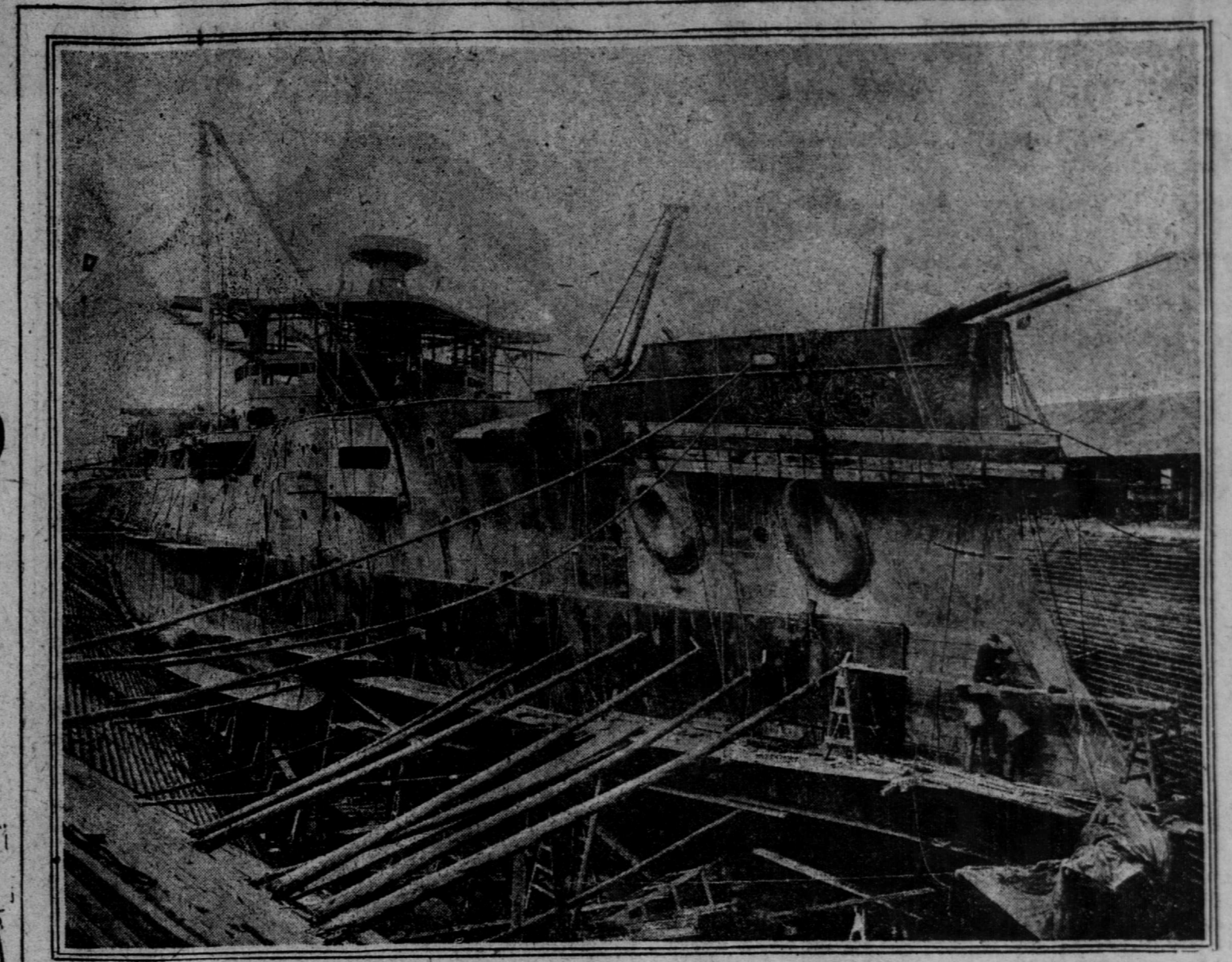


LAYING THE STEEL DECK PLATING

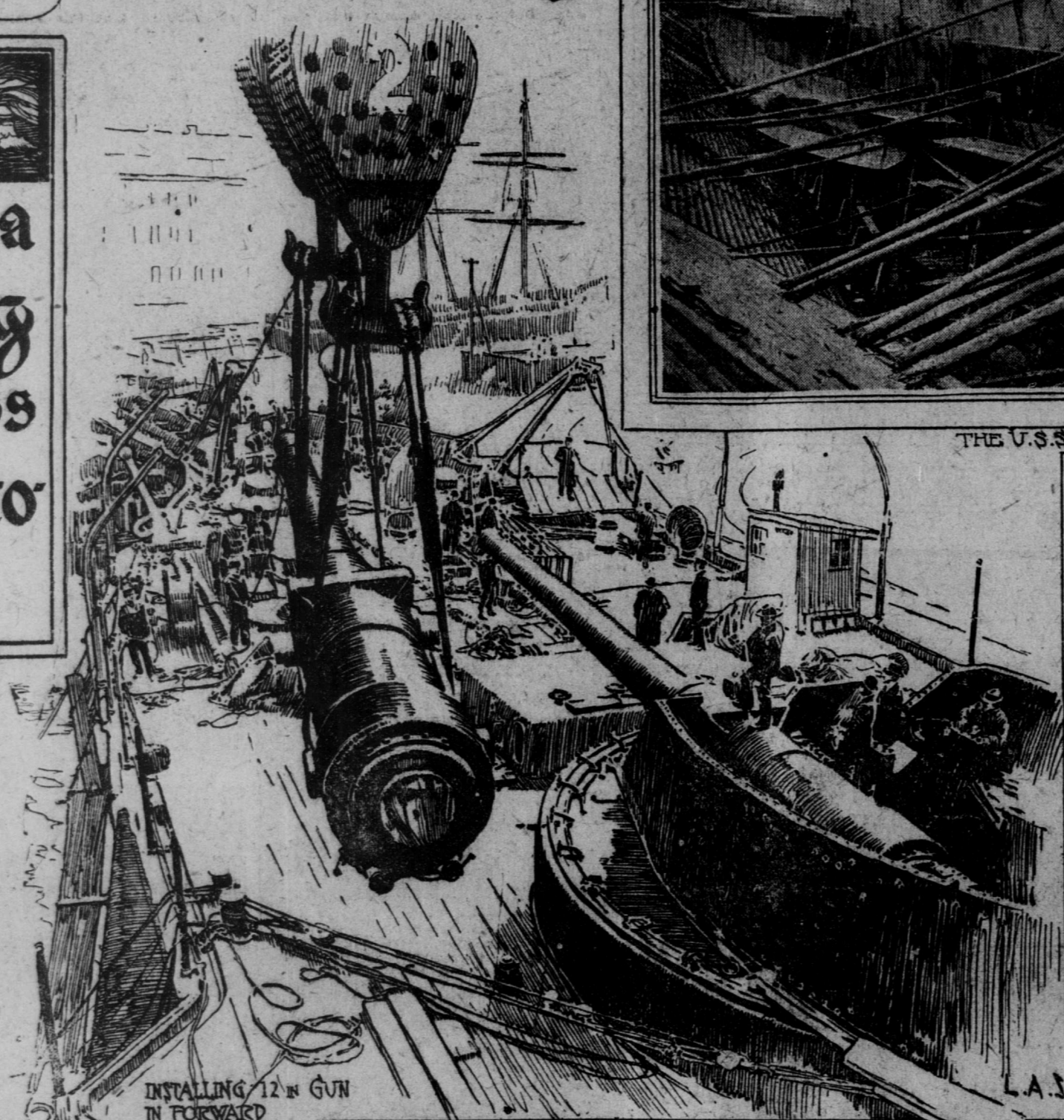
turelessness of spars and rigging and ballooning canvas, beckoning the sailor to nimble and dizzy adventures, have been succeeded by the exact requirements of electricity and mechanism. What mystery remains is to be found in the massed powers of destruction,

tured that the modern battleship is developing with such marvelous rapidity as to promise the nearest approach to our physical organism on record. A second surprise awaits the layman on board a battleship in his dawning realization that the ponderous, steel-

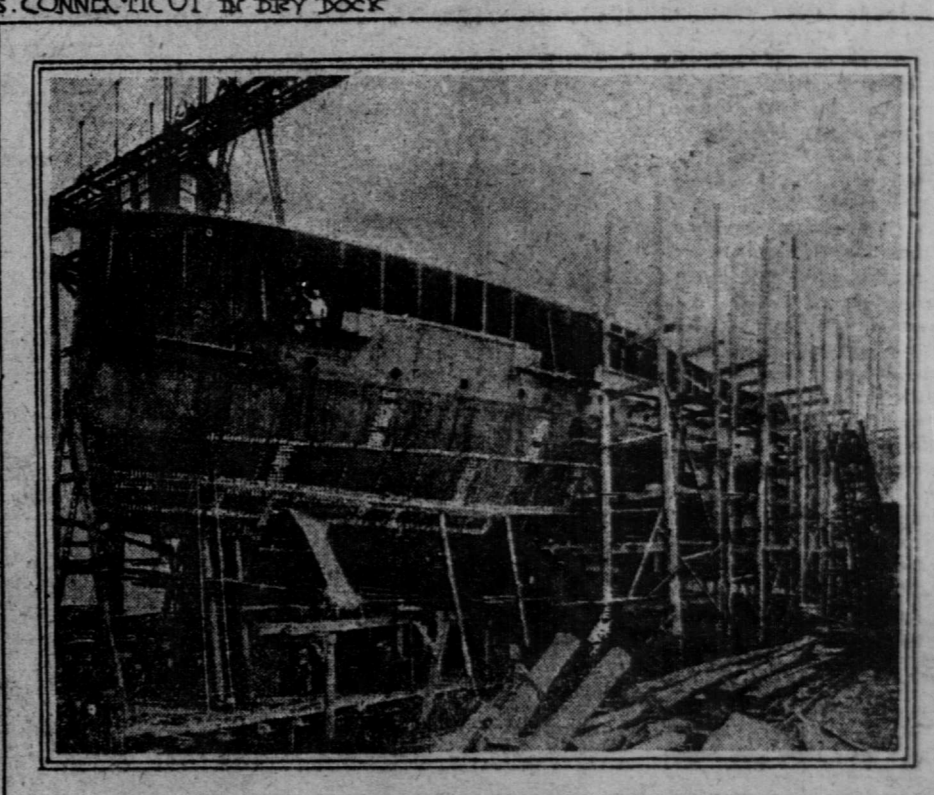
studied machine over and under him may, in time of conflict, become mechanically demoralized, crippled and blown to pieces in the flash of an eye. This feature of the battleship is not often emphasized, but it is the most stubborn and discouraging of them all.



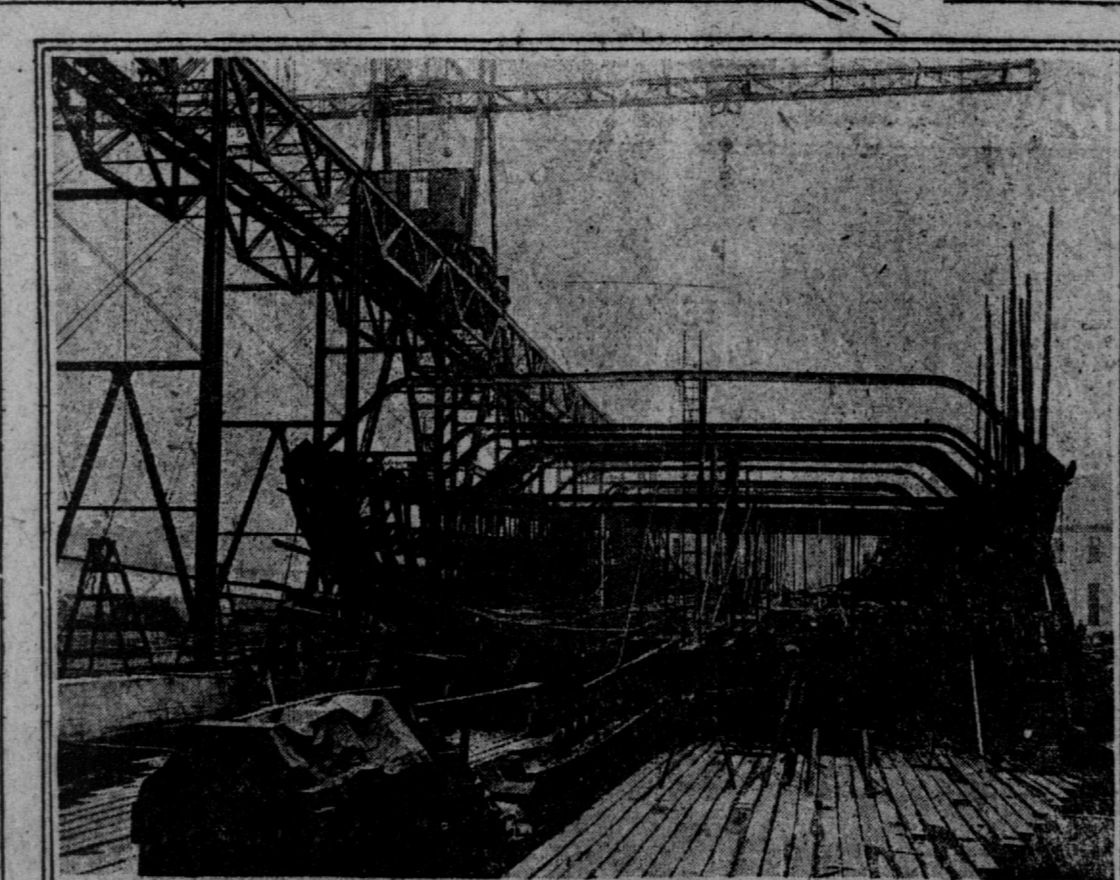
THE U.S.S. CONNECTICUT IN DRY DOCK



INSTALLING 12 IN GUN IN FORWARD TURRET



WITH THREE QUARTERS OF PLATING IN PLACE, STERN VIEW



PLACING BOTTOM FRAMES OF HULL IN POSITION

While our own navy, in the modern sense of the word, did not begin hatching until 1883, the United States being previously represented upon the marine highways by a fleet of superannuated wooden frigates punctuated in the nineties with a few creditable battleships, it was not until fifteen years later that we began to emerge from naval obscurity. The Dewey triumph in Manila Bay, the drubbing dealt to Cervera off Santiago and more recently the Japanese victory in the Korean Straits—these tragedies have impressed us with some realization of the powers of modern naval artillery. But, reviewing them, we may wisely remember that in each instance the efficient runners were all on one side.

Prior, then, to 1883, as an American admiral recently soliloquized, a sense of humiliation dogged the American naval officer as he went about his duty in foreign seas and sections. In the Far East, in the minor nations fringing the Mediterranean, and even in the deserts of South America, audiences smiled patronizingly upon him and from a sense of politeness avoided speaking of naval subjects in his presence. None but naval experts and a few Americans who chafed abroad comprehended just how cheap and splendid the Western republic appeared then in the eyes of the world. Incredible as it may seem, weary with warring among ourselves in the '60's,

the United States as a naval factor became drowsy, nodded and fell asleep like a spent runner on the tape. Silence invaded the once busy dockyards of the navy—a silence unbroken for twenty years, or until the awakening guns of 1898.

There are now in this country six great shipyards, capable of hatching first-class battleships as swiftly and substantially as any war ship hatches on earth. As soon as Congress makes a necessary appropriation and the color of the coin is seen, so to say, the designer sets to work and within six months the big war machine is built from stem to stern—on paper. Bids are solicited, figuring is done and contracts are let. Thirty days later, perhaps, a tithe of a thousand workmen, who will all have a hand in her creation, will be hewing, sawing and hauling the stanch timber designed to be her skeleton. Months pass. More and more activity is shown around the building slip, where the huge vessel is slowly rising from her keel and assuming definite curves and angles. Meanwhile foundries have started casting and forging the massive armor plating, and perhaps the still more massive guns and turrets.

Other months pass until the work of a full regiment of brain and brawn begins to reveal impressive results. The skeleton is done, and now remains to be clothed in armor. Plate after plate

is welded and riveted over her sides until, ready for launching, she wears a corsage of eleven-inch case hardened steel weighing some four thousand tons. Arrived thus and weighing in bridal trim a round ten thousand tons, finely lined and perfectly poised, she gracefully answers a sudden powerful touch, generated by an electric button and launches down the ways. Then comes the most important feature of the entire programme—the installation of her turrets and guns, of heavier armor belts, of vast boilers and engines which may develop 4500 horsepower, and the thousand additions necessary to a mated battleship.

It has been asserted that these costly agents of destruction or protection in war and of patrol in peace are too finally built, that they would shake themselves to pieces and would be surely destroyed if grounded. Experience has shown these predictions to be false in the main. War ships have gone ashore and sustained heavy damages, but have been saved, repaired and restored to active service. Swift armored cruisers have not shaken themselves to pieces, but have remained intact, though their propelling machinery has been relatively more powerful than that of any transoceanic liner. Facts of this caliber have routed prophets of pessimism; critics formerly frequent have now been practically silenced, and designers of merchant vessels have benefited in many ways by the daring initiative taken by the architects of war.

It was with the Crimean war that the age of the ironclad really was inaugurated and it is one of the strangest features of history that Russia, which today has no standing in the naval world, was the pioneer and inspiration of modern naval warfare. Prior to 1854 inventors had dreamed, dreamed and seen visions, suggestions had been advanced and failures recorded, but fifty-two years ago the visions and suggestions were materialized. At Sinope, in 1853, the first damaging effect of shell fire on wooden vessels was shown in action. A Turkish squadron, numbering seven frigates, a pair of corvettes and as many steamers, was anchored under the guns of a battery in Sinope Straits. The Turks were not expecting a Russian attack and knew nothing of the sleeping destruction in the smooth-bore shell guns flecking the Russian battery. They were swiftly and utterly annihilated, and a new note of war was sounded.

It reached the ears of Napoleon III, who in September of the following year ordered five floating batteries equipped with armor. They were of 1400 tons displacement, 84 feet long and of only 8 feet draught. Sheathing each timber hull was an iron belt of armor 4 inches thick. His vessels had some deck protection above the batteries, and boasted the germ of what has come to be known as the conning tower—a bit of iron shelter for the pilots. His heavy, sullen vessels were soon copied by England. Then came our Merrimac and Monitor, and no period on human record has witnessed changes so numerous, so startling and so far reaching as the succeeding one of forty odd years.

If we shall realize that in its broad-sided impressiveness we must approach and examine the newly launched battleship of today, scanning her massive body it is difficult to realize that she has greater bulk below than above the water. Her submerged body measures 24 1/2 feet, leaving 23 feet from water to deckhead, 35 feet 4 inches to military topmast and 165 feet 8 inches to signal

top. Her beam is 76 feet 8 inches, or more than an average street. She is nearly 300 feet long.

As we patrol the main deck of the starboard 'bow the most striking objects are two thirteen-inch guns of the main battery, with their dark mouths showing twenty-three feet through the ports of the revolving turret, itself a round steel wall seventeen inches thick, revolving on a circuitous track based just under a barrette built up from an eighteen-inch armor belt below. Standing there we see an unbroken wall of steel seven inches thick, protecting the gun crew, the pivotal machinery and powder and shell. In the uncertainties of war it is not likely that one shot in thirty striking this turret would find an opening. Just above the muzzle of the starboard gun is seen the turret sighting hood, from which the chief gunner watches the enemy, and, by means of handy levers, trains and fires the great guns.

Peering over the main turret are seen the four forward eight-inch rifles, paired in two turrets, one on each side of the ship. Armored ammunition tubes pass from the barbettes down to the three-inch steel deck for convey of powder and shell. On the main deck and under each eight-inch turret is a six-inch gun so arranged as to deliver broadside and dead ahead fire. Taking our stand at the stern and gazing forward, we see the same array of turrets and guns. Behind the forward thirteen-inch turret, and forming the base of the military mast, is the conning tower plated with twelve inches of steel. Here the commander will place himself when going into battle, and through the narrow sighting hood will watch the enemy. Inside the conning tower is an elaborate arrangement of telephones, electric calls and speaking tubes communicating with the engine-rooms, the various gun stations and the steering station at the far end of the ship.

When this battleship goes into action one man, snugly tucked in this small steel cage, can stand on any part of the vessel, veering her at will, wheeling her grim turrets in a flash and focusing her huge guns on any given spot of the enemy. Above the conning tower is the pilot house, from which navigation is directed except in time of battle. Over the pilot house, on each side of the mast, are 200,000 candle-power searchlights, and the range finders which very accurately determine the distance of the enemy can be very accurately determined. Descending to the berth deck and seeking the extreme forward end of the vessel, we enter the bow torpedo room, where a fixed launching tube, ready for its deadly work, bends at a sinister angle to the water. The torpedo, weighing 1000 pounds, has three compartments. Rammed in the first is a charge of gun cotton, fired by contact when the torpedo strikes the mark; the second is charged with air at 2000 pounds to the square inch, and the third houses the small compressed air engines which drive the screw propellers automatically. There is another fixed torpedo tube at the stern, and on each broadside there are two movable tubes. Between the main turrets are stowed lifeboats, gigs and steam pinnaces.

Considering the highly developed gunnery of our navy, is it any wonder that the lifeboats and other life-saving appliances on any one of our greater battleships will not carry more than a third of the men on her decks and that every fighting man is made to feel that he is a part of the vessel and must so survive or perish?