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NEW YORK, SATURDAY, DECEMBER 14, 1901.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

PEACE AND A POWERFUL NAVY.

We are building up a powerful navy for the express purpose of preserving the peace, and every battleship and cruiser that hoists her flag in commission is a pledge that the peace will be kept. In the past few years we have made wonderful advancement in possessions, in commerce, and in wealth; and great as have been the additions to our naval strength, they have been trivial in comparison to the enlargement of the national interests, which the Navy is called upon to defend.

In all sincerity we proclaim ourselves to be a peace-loving people, and in adding ship to ship we believe we are making more remote that day when the ambitions of other nations might have led them to violate those clearly-stated and easily-understood principles, by which we wish to regulate our conduct as one of the great nations of the world. In an earlier age, to possess the implements of war was to make haste to use them; to-day the nations that maintain the greatest armaments appear to be the most reluctant to set them in motion. It is certain that so long as our naval strength is adequate to our necessities, war will never be thrust upon us.

As a journal devoted to the peaceful arts, we present this delineation and description of our growth as a naval power, in the firm belief that the first and last duty of our navy, the fundamental object of its existence, is to place the nation in a position of defense so secure and unassailable that we may pursue the arts of peace without fear of molestation, or even the shadow of affront.

The spirit which at once begets and controls our determination to have a navy commensurate with our national standing was admirably defined in a recent utterance of the Secretary of State: "There will be no more surrender of our rights than there will be violation of the rights of others. No wantonness of strength will ever induce us to drive a hard bargain with another nation because it is weak, nor will any fear of ignoble criticism tempt us to insult or defy a great Power because it is strong."

WARSHIP CONSTRUCTION AT THE GOVERNMENT NAVY YARDS.

Popular delusions die hard; and one of the most pernicious and persistent of these is the belief that warship construction when done by the government is poorly done, and costs more than it does at private yards. There was a time, it is true, when the navy yards could not compete with private firms; but that was a day when the yards were overridden by political influence, and encumbered with lazy incompetents, who owed their positions to "pull" with the local politicians. Thanks to the trenchant reforms instituted and carried through, largely by the efforts of the present Chief Constructor, Rear-Admiral Bowles, our navy yards have been entirely emancipated from politics, and the organization, plant, discipline and character of work turned out, have been brought up to a standard that is fully equal to that of the best private establishments.

The Naval Constructors believe, and we fully agree with them, that the time has come when it would be to the nation's advantage to have a certain proportion of its ships constructed in government yards. The plant and the working staff at New York and Boston have been brought up to such a state of efficiency that the largest battleships could be constructed with economy and great efficiency. The high cost of the "Texas," the "Maine" and other government-built ships cannot be quoted against this statement, since those vessels were built before the yards were reorganized, and when the plant was old and inefficient.

The construction of ships in government yards would have a two-fold advantage. It would stimulate private builders to exhibit some of that dispatch, which has recently been so conspicuously absent (some of our battleships are a year and a half, and our torpedo-boats two and a half to three years behind their contract date), and it would be possible to keep the well-trained navy yard forces continuously at work, instead of having to discharge a large part of them, whenever routine repair work is slack.

The practice of building some of the warships in government yards is followed to advantage in the leading European navies. We should adopt it here.

OUR NAVAL DEVELOPMENT SINCE THE WAR WITH SPAIN.

In undertaking to describe the growth of the United States navy since the war with Spain we were somewhat at a loss to determine the best basis on which to make the comparison between our standing in 1898 and in 1901; but since the special naval number which we published at that time served to make our readers thoroughly familiar with the ships that actually took part in the naval operations of 1898, we have decided that in the attempt to make clear our *post-bellum* progress, we cannot do better than eliminate the vessels that were in commission during the war, and give in the present number a description and illustration of every type of ship that has been either commissioned or completed, or is now under construction, or whose construction has been authorized since the war. Just how numerous and imposing will be this new navy may be judged from a glance at the inset drawing, showing the vessels grouped in one vast fleet. The effect of this illustration will be deepened by a study of the table showing the details of displacement, speed, armor and armament which will be found at the close of this issue. For a still more detailed description of the vessels, the reader is referred to the larger illustrations, which include one of every type of vessel shown in the general view of the fleet.

We wish, however, at the very outset to emphasize the fact that no one, even after such a careful study of our new navy as we have just suggested above, will obtain an adequate knowledge of the great advance which we have made since the war, unless he pays particular attention to the fact that the armor and guns carried by the new ships are vastly superior to those which won the victories of Santiago and Manila Bay. Gun for gun, thanks to improved gun steel and smokeless powder, the weapon of to-day delivers a blow which is in some cases nearly 100 per cent greater than that delivered by the same piece in 1898; while the armor with which the latest of our ships will be protected has from 20 to 25 per cent more power to resist penetration than the best armor carried by our vessels in the war, and from 40 to 50 per cent superiority over the older armor, that was fabricated before the introduction of the Harvey and Krupp systems of face-hardening. There is to be considered furthermore the great advantage conferred by the substitution of smokeless for the old smoke-producing powder. Recent testimony of naval officers in regard to the Santiago operations has shown how greatly our ships were impeded by the smoke from their own guns, some of the vessels being at times as completely bewildered as to the actual conditions of battle as if they were enveloped in a dense sea fog. In the new vessels, in spite of the greater rapidity of fire, and the enormously increased velocity and energy of the projectiles, the crashing discharge of the batteries will be accompanied merely by a slight haze, similar somewhat in its atmospheric effect to that of summer heat, and even this will be quickly dissipated. Moreover, improved mounts, perfect balancing of the guns, and telescopic sights, will enable the gunner to keep his piece, except in a heavy seaway, continually upon the object; and it is pretty certain that if our ships are ever again called to cast loose their batteries in a naval engagement the efficiency of their gun-fire will be increased four-fold or more. There will be no such record as the 3 per cent, only, of hits, which was the best we could do in the fight with Cervera's fleet.

Nor must we in estimating the fighting value of our new navy forget that there has been a decided advance in that most vital element of a ship—motive power. The improvements in gun steel have been accompanied by improvements in steel for boilers, for shafting, and for the moving parts of engines. The old Scotch boiler, admirable as it is, has given place to the water-tube type with its rapid steaming abilities and its larger rate of horse power per unit of weight. The economy of weight in motive power, and the even greater saving of weight accomplished by better methods of armor-plate making, have enabled the naval constructor to allot a larger share of the total displacement to motive power, with the result that speeds have gone up from the 15 knots of the "Indiana" to the 18 and 19 knots of the "Maine" and "Virginia" classes.

Lastly, and perhaps most important of all, there is the fact that the new fleet is made up of vessels which are pre-eminently sea-going, with lofty freeboard, a greatly increased radius of action, and a much more generous provision for the comfort of the crew. This last feature, known technically as "habitability," is of inestimable importance in its effect upon the contentment and general *morale* of the ship's complement. Taken altogether, the assemblage of ships shown in our table is one of which we may justly be proud; and we feel that there is no more fitting time than this to speak a word in praise of the careful observation of the trend of foreign development, the discriminating selective judgment, the characteristic originality, and the great professional skill which have enabled the Bureaus of Construction, Ordnance and Steam Engineering to produce a fleet of vessels which, ship for ship, we believe to be the peers, and in some respects the superiors, of any that are built or building for the navies of the world to-day.

"REVOLUTIONIZING" NAVAL WARFARE.

The ponderous battleship, clothed with foot-thick armor, bristling with half a hundred guns, crammed with the costly products of the steel mill and the machine shop, and representing an investment of some seven millions of the nation's money, expresses our Twentieth Century ideal of the most perfect fighting machine for naval warfare. War is costly; upon the high seas it is enormously so. The history of naval warfare proves that there is no short cut to success, and certainly none by any byway of cheap, "kill-all" devices, warranted to deal out superlative destruction to the enemy at a minimum depletion of the national funds.

It is for very good reasons that, in the evolution of the modern navy, there has been a growing tendency to increase the size and cost of the individual unit. The law of evolution is as inexorable in a warship as in the processes of natural life; and in leading us to the best possible type it is scarcely less sure a guide. So complete is the interchange of ideas among the naval architects of the world, and so singularly free are they from that tendency to cling to national types, which in other spheres of activity prevents unfettered development, that we are justified in believing that the present make-up of our navies is about the best that could be devised for the work they have to do.

Naval development, then, has always moved in the direction of big units, that are slow and costly in construction, but represent, each, a vast concentration of fighting power, whether for attack or defense. Our battleships have grown in ten years from the 6,000 tons of a "Texas" to the 16,000 tons of a "Georgia," and our 5,000-ton cruiser "Chicago" of 1885 finds its counterpart in the 14,000-ton "California" of fifteen years later.

The history of modern naval development shows that inventors have been quick to appreciate the weak point in this policy of concentrating the fighting strength in a few large units rather than in many smaller ones; and periodically the naval world has been startled by the advent of small, cheap, easily-built devices, which at one fell stroke were to "blow" anywhere from one to seven million dollars' worth of ship "out of existence," and incidentally were to "revolutionize" the whole theory of naval construction.

The naval revolutionist is ever with us; and not even the contemplation of the long and steadily-growing list of naval engines of destruction that failed to destroy, deters each new "annihilator" from being duly heralded as sounding the death-knell of the battleship and the breech-loading rifle.

There are but few of us so young but we can remember the advent of the torpedo-boat, and the feverish haste with which the naval powers vied with each other in setting afloat whole squadrons of these now-discredited craft. For the torpedo-boat found its immediate answer, first in the rapid-fire gun and the torpedo-net, and then in the "destroyer"—a larger edition of itself, capable of running it down at sea and sinking it with the long-range rifles with which it is armed. The predicted revolution never took place, while the battleship continued to grow in size, power and costliness.

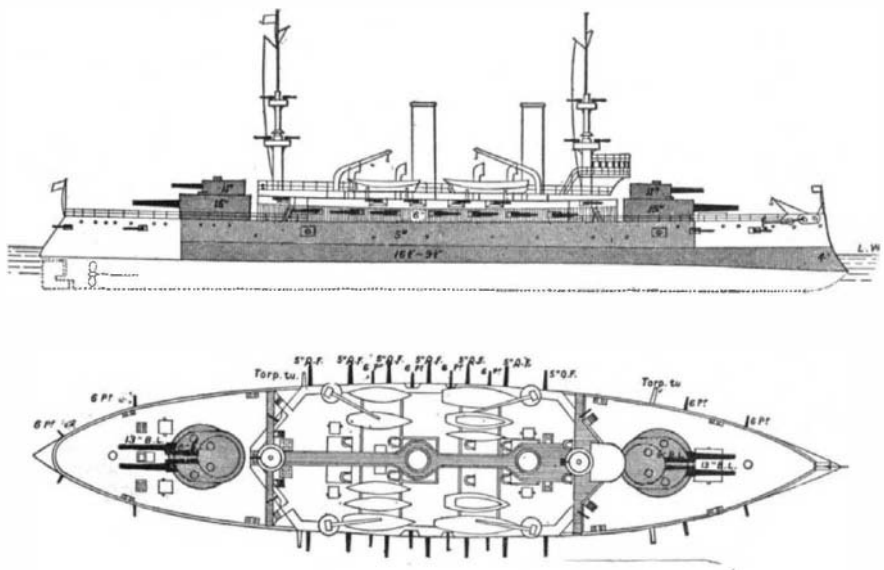
The ram was answerable for another speedy revolution that has yet to materialize. Great Britain built her "Polyphemus," and the United States her "Katahdin;" but the former is now doing some kind of obscure duty in the Portsmouth dockyard, while the latter has already, we believe, found an abiding refuge in our museum of naval curiosities. The turtle-backed submergible ram, difficult to detect, impossible to hit, or, if hit, deflecting the shot harmlessly from her rounded back, running amuck among a fleet of unwieldly battleships and sinking them with pitiless deliberation, presented on paper, it is true, an alluring picture; but the Spanish war came and went while the "Katahdin" lay rusting at her moorings.

The *raison d'être* of the torpedo-boat was, of course, to be found in the enormously destructive power of modern high explosives; and about the time that we awoke to the fact that the torpedo-boat had lost much of its terrors we were startled by the advent of the so-called "dynamite gun." Here at last was a demon of destruction which was worth just as many battleships as happened to come within range of its shells,

Why spend five years in building a 12,000-ton ship when, for the same cost, one could put afloat in one-fifth of the time a dozen fast little "dynamite cruisers," bearing the awesome name "Vesuvius," and each capable of sinking a battleship a minute by the simple expedient of tossing a quarter of a ton or so of dynamite aboard from her pneumatic guns? The Spanish war has passed into history, and with its passing was written the last chapter of the "dynamite cruiser" scare. It was a spectacular comedy, that midnight demonstration off Santiago Harbor, when the little craft was sent in to scatter "earthquakes" among the rocky bluffs of the Cuban coast. Later, on the morning of that memorable sortie from Santiago Harbor, the destroyers were the first to be destroyed, while it was a shell from the 13-inch gun of a battleship that caused the last of the fleeing enemy to strike colors and run for the shore.

The latest annihilator of the battleship and big armored cruiser is the submarine boat. Far be it from us to deny that this type of vessel may possess tactical and strategetical possibilities, which it only requires the test of actual war to determine. Used in connection with a system of harbor defense the submarine will exert considerable moral, if not material, powers; and doubtless the possession of a few of these vessels by a blockaded port would cause the investing ships to keep continually on the move, while they would be the cause of much nervous strain and justified anxiety on the part of the enemy. But there is little likelihood that the submarine boat, any more than the torpedo shell, the ram or the torpedo-boat, will drive the big fighting ship from the high seas. The submarine boat, when submerged, is only less able to see the enemy than is a torpedo-boat at the surface when enveloped in the densest of fogs, and the impossibility of sighting the enemy, or keeping close touch upon his course, reduces enormously the chances of getting in the vital blow. We shall build submarines in greater or less numbers, but from the position of undue importance which they have taken at the appearance of the first successful type, they will be relegated, like all previous "annihilators," to their proper subsidiary position among the fighting units that go to make up the navy as a whole. So, too, with the dirigible torpedo controlled by aerial impulses, of which we are beginning to hear again, and of which we shall doubtless hear much more in the near future. It is certainly awe-inspiring—this vision of a solitary operator, sitting secure on some headland point on shore, or within his armored station on a ship, controlling by the magic Hertzian waves the course of a little death-dealing torpedo craft, and delivering its torpedo with unerring aim at the unsuspecting enemy. An ideal device, were it but practical; which in the nature of things it never will be, except under such a favorable conjunction of wind, weather and motionless ship, as one might wait for throughout a whole naval campaign and never secure.

There has been much evolution but no revolution in the deliberate growth of the fighting ship to its present size and power; and to the navy that can concentrate in greatest numbers the combination of a big ship, well-protected guns, a steady platform, a true eye, a quiet nerve, unflinching courage, and faultless discipline will the victory of the future belong.



Gun and Armor Plan; "Kearsarge" and "Kentucky."

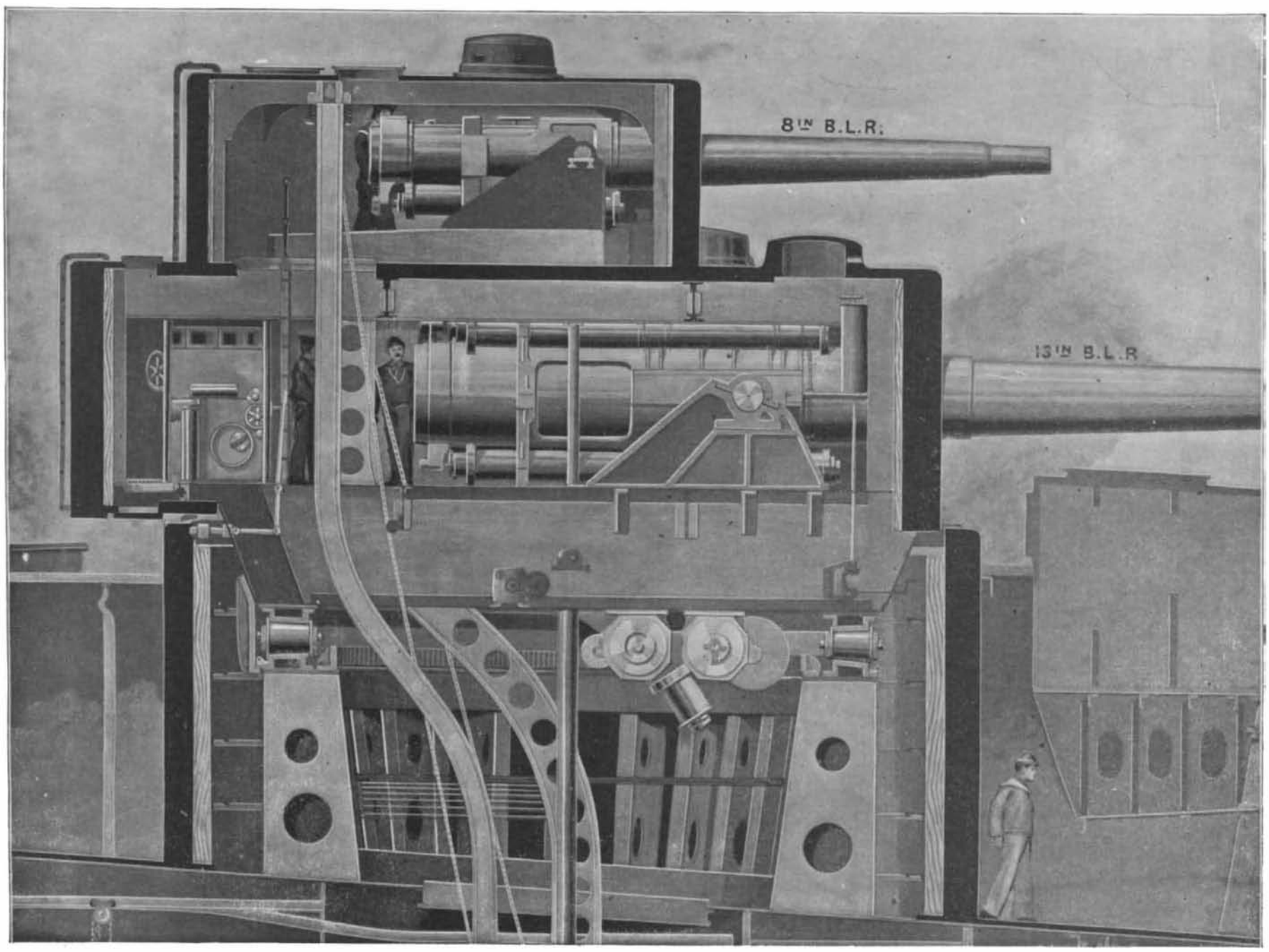
Battleships.

BATTLESHIPS "KEARSARGE" AND "KENTUCKY."

The first addition to be made after the close of the Spanish war to our small fleet of battleships (we had but four first-class battleships in commission during the struggle) consisted of two sister ships, the "Kearsarge" and "Kentucky," of about the same displacement and speed as the "Iowa," but differing radically in their armament from that vessel.

The most novel feature of the "Kearsarge" was the introduction of the now-famous superposed turret, over which there has been waged one of the most strenuous controversies of modern times. The object aimed at in this device is the securing of the greatest possible arc of fire for the various guns, and particularly for the 8-inch rifles. It was considered that by dispensing with four of the eight 8-inch guns as installed on the "Oregon," and placing the remaining guns and turrets on the roof of the 13-inch gun turrets, there would be the same concentration on either beam and also a dead-ahead and dead-astern fire, which would not be accompanied with any inconvenience to the 13-inch gun turrets. There would thus be a complete saving of the weight of four guns, two 8-inch turrets, and the necessary ammunition hoists, turning gears, etc. The idea of the double turret was from the first very strongly opposed by the Naval Bureau of Construction, both on structural and military grounds, an opposition which has at last succeeded in excluding the system altogether from our latest battleships.

Briefly stated, the structural objections are: The concentration of weight so near the ends of the vessel, tending to impair her seaworthiness; the risks in docking due to this concentration; the complication involved in concentrating at one point the large ammunition supply necessary for the four guns, and in the juxtaposition of the four ammunition hoists and the necessary power to work them; and last, and perhaps the chief of all, the abnormal stresses to which the substructure of the double turrets would be subjected from the simultaneous recoil of four heavy



LONGITUDINAL SECTION THROUGH BARBETTE AND SUPERPOSED TURRET OF BATTLESHIP "KENTUCKY."