OUR NEW NAVY—THE CRUISER CHICAGO.

The contest between defensive naval armor and artillery, which has been going on so persistently since the Monitor and Merrimac fought their famous duel at Hampton Roads, has at last reached a point where naval construction at least seems to pause to take breath. Such ponderous armor-clad monsters as the Thunderer, Devastation, Benbow, Inflexible, and others of equally terrifying nomenclature have been defiantly launched from Britain's shores to awe the world, while our French and German cousins keep their standing armies at an apoplectic fullness and tension of nerves, while their gun foundries are ablaze night and day turning out modern ordnance which (on paper at least) heads the race until some newer and tougher-skinned leviathan is launched and restores the balance for a while. The French have always been good modelers of marine architecture, and their productions were ever of that swift, graceful type that excited the admiration and envy of their covetous British neighbors; but unfortunately for themselves, they did not maneuver or fight their ships with the skill they merited, and from as far back as history relates we find that whenever the Gaul turned out a particularly good craft, the Briton lost little time in trying either to fight her off the seas or capture or sail her himself; and in our own war of independence, our fastest and best ships were modeled after the French. Our Constitution and her sister vessels often found themselves in combat with vessels of like construction that had been captured from France by the British. The Constitution captured the Guerriere, a French ship manned by Britons, and the Bon Homme Richard, a superannuated old French frigate, commanded by Paul Jones, captured the English-manned French ship Serapis. And the process still continues in a modified form. It is not done by capture, of course, but the French type can be distinctly traced in almost all the modern ships, be they Russian, Prussian, or British or American. Since our civil war we have been quietly watching the improvements going on across the water, and when we decided to build a new navy, did we lay the keels of Benbows, Inflexibles, or Thunderers, at millions of dollars each? Not at all. We built as near the French types as we could, and from the looks of the ships they might as well have been planned by French naval architects. They certainly do not resemble the English men of war, as our public would have noted if their war ships were not so shy of our eastern ports, especially New York.

But the public has received the impression that our new crusiers are armor-clad, or at least shot-proof. This is not so. Of the four vessels, Dolphin, Atlanta, Boston, Chicago, so far finished, not one has a thickness of side to prevent the entrance of a good-sized rifle bullet, and an able-bodied man with a sledge hammer and ten minutes' time could make a way in for himself. During a conversation with one of their gunners, he said: "The thinner they can make these ships and float them, the better. There's no ship in existence whose sides will keep out the best modern rifle shot, and if they pile on the iron till they do, the concussion will shake the ship to pieces, or derange its machinery."

Another, when spoken toon the subject, said he would rather "fight on the open deck, where the shot could do its work cleanly, than inside a half-protected inclosure where every shot multiplied itself a hundredfold in the shape of fragments and splinters. Better kill one or two outright than have fifty mangled for life." And the man was right, for it seems as if modern war ships, like modern armies, must leave off armor and strip for the fight. We hear of an ironclad that is to be belted with twenty-one inches of steel fore and aft. It sounds ponderous and safe, but what safety would there be behind it when struck by a bolt from one of the forty-three foot 115 ton Armstrong guns, weighing 1,800 lb., flying at the rate of 2,148 feet per second, or receiving a blow which did not even penetrate, but with an estimated smashing force, such as the new breech loaders exert, of a column such as the obelisk now in Central Park would have if lifted to the height of Trinity Church spire and dropped to the pavement?

But what would our sailor think of the armor belts, if he knew of a gunnow being constructed by the Krupp works, at Essen, Germany, weighing 330,000 lb., its shot standing six feet high, weighing 1½ tons, capable of piercing a solid iron wall 4 feet thick? In fact, this monster could load up and fire as shells, the famous guns that Nelson used on the Victory. On the other hand, the Victory, with her regiment of a crew, armed with the modern quick-firing 3 lb. breech-loading rifles, would reduce to a pepper box any available war ship our navy has at present that would lie beside her in action for five minutes. A trial was recently held abroad, in which a steel torpedo boat under full steam, running about 15 knots, was started past a war ship going in an opposite direction. The torpedo boat had no one on board, as may be supposed. Fire was opened on her at two miles distance, with small guns only, and she turned turtle and went under before getting abreast of the ship. The number of bullets that struck her was a handsome percentage of those fired, and the photos. taken of her after she was fished up showed the true pepper box pattern.

It would seem then that the modern gun had the best of it, and perhaps the best thing for us to do in the way of naval *defense* is to build a dozen or two of the familiar, flat, homely American monitors, and add extra thicknesses of metal to their turrets as the big guns grow bigger and keep our modern cruisers out of their range altogether. We give some exterior views of the Chicago as she now lies at the Brooklyn Navy Yard. She is the latest and largest completed of our new cruisers. She is a stately, handsome, and swift vessel of the thin-sided kind. Her decks are broad and open, with appointments of the best material and construction, and is altogether as fine a representative of this sort of vessel afloat. In the same basin beside her lies the old double-turreted monitor Miantonomah, her opposite in almost every respect.

The following are the chief dimensions of U. S. twin-screw steam cruiser Chicago:

Length between perpendiculars	315 ft.
Length on water line	325 ft.
Length over all	334 ft. 4 in.
Depth—garboard strake to under side of spar deck.	34 ft. 9 in.
Height of gnn deck portsill from load water line	10 ft.
Height of spar deck port sill from load water line	18 ft. 6 in.
Breadth, extreme	48 ft. 2½ in.
Draught of water at load line, mean	19 ft.
Displacement	4,500 tons.
Complement of men	300
Battery—Four 8 inch long breech-loaders in half turrets, eight 6 inch and two 5 inch on gun deck.	
Indicated horse power	5,000
Sea speed	14 knots.
Capacity of coal bunkers	940 tons.

Natural History Notes.

How Monkeys Eat Oysters.—A writer in *Nature* gives the following description of the monkey's method of taking and eating oysters:

In the islands of Meigue archipelago, the rocks left bare at low tide are covered with oysters of different sizes. A monkey, probably the *Macacus cynomolgus*, which inhabits these quarters, prowls along shore when the sea is low, and opens the oysters attached to the rocks by striking the upper shell with a stone until he has broken it. Then he extracts the mollusk with his fingers or swallows it directly from the shell. Upon frightening these epicures away, the observer found that the stones that they left behind had been selected with a view to being easily grasped by the animal's fingers, and not with regard to heaviness. The fact is the more curious in that the rocks to which the oysters are attached emerge from mud, and the monkeys are obliged to procure the stones on the shore at some distance off. Instinct singularly guides them in the operation, for they begin by breaking the hinge, and then the shell above its point of attachment. The gibbons that inhabit these islands do not eat oysters.

How Spiders Moult.—When a spider is preparing to moult, it stops eating for several days and fastens itself by a short line of web to one of the main lines of its snare, which holds it firmly while it proceeds to undress. The skin cracks all around the thorax, and is held only by the front edges. Next the abdomen is uncovered. Now comes the struggle to free the legs. It works and kicks vigorously and seems to have very hard work, but continued perseverance for about fifteen minutes brings it out of the old dress, and it seems almost lifeless and is limp and helpless for several minutes, but gradually comes back to life and looks brighter and prettier than before.—*Swiss Cross.*

Vitality of Seeds.—The experiments of Count De Buysson show that it is an advantage to soak seeds of doubtful germinating power for thirty-six hours in some liquid containing nitrogen (for example, 15 grains of guano to a quart of water), since the germinating power of a seed is proportionate to the amount of nitrogen it received during its formation, and which it has retained during its period of dormant activity. If it be desired to preserve the vitality of seeds for any length of time, it is necessary to prevent heat and moisture from affecting them, since these are the agents that facilitate germination.

The variation in the period that may elapse between the planting and germination of seeds, of which the henbane is a well-known instance, has lately been shown to exist also in the case of the Brazil nut. From experiments made at Kew, it appears that while some of the seeds sown germinated in a few weeks, others did not germinate for two years.

A Rain of Ants.—*La Nature* states that at five o'clock in the afternoon, on July 21, the city of Nantes was the scene of a curious phenomenon. A genuine rain of wood ants fell in the streets and squares. These insects, some of them winged and others not, fell like snow flakes upon the heads of pedestrians. This living and rather unusual kind of shower lasted till six o'clock. Nearly every quarter of the city was strewed with the insects. The phenomenon was attributed to violent whirlwinds, the precursors of a heavy storm that burst upon the city on the following night.

The Ascent of Sap.—In a paper lately read before the Royal Botanical Society of Edinburgh by Mr. G. F. Scott Elliott, on "The Ascent of Crude Sap," the author asserts that crude sap travels in the lumen or cavity of cells, and not within the walls of the vessels and tracheids, as Sachs supposed. Transpiration ceases if the lumina are closed by injection or by strong compression of the stem, although continued when the cell walls are changed to gum. He regards Dufour's experiments with bent twigs as quite fallacious. If air be present in the vessels, it can only be the case during the day at the time of the greatest loss of water, since the vessels form a close system, and wet cell walls are impervious to air. He considers it physically impossible that air bubbles can give any active assistance in the process. It is impossible at present to calculate the separate effects of capillarity, root pressure, osmosis, and transpiration in causing the ascent of crude sap.

Malformation of Fish Fry.—Mr. Seth Green contributes an article to the *American Agriculturist* in which he describes the various sorts of malformation observed in newly hatched fish. He says that the "two kinds of malformations most frequent among the young fry are those with two heads and one body or trunk and those known as Siamese twins, from the fact of their being connected similarly to that celebrated monstrosity. Rare cases occur where the fish have three heads on one body. Among the millions of young fry that have passed under my observation, I have seen but two specimens of this kind. The fry are also subject to all sorts of curvatures of the back bones. The curves are found at nearly all degrees, from a slight bend to a complete circle—the head and tail meeting. Some which are affected in this way are able to swim, but they go round and round in a continuous circle. Others are so knotted as to be unable to make any progress whatever. The cause of death to these peculiarities is the absorption of the yolk sac which is attached to each young fry. While this remains, food is unnecessary, and it will sustain life in the deformed fry for about thirty days and in a healthy fish for about forty days. When it is gone, the former die of starvation, as they are unable to find food. For the sake of the experiment I have tried to prolong their lives by careful feeding, and have succeeded in so doing for about sixty days, after which they succumb. One peculiarity is that the malformed fry have a tendency toward a superabundance of heads rather than tails. I have never found a specimen with more than its share of caudal appendage.

"Albinism is not unfrequent. The fish are perfect albinoes in every respect, even to the pink eyes. These we have raised, and they are really beautiful little creatures, and when placed in a glass jar every bone and fiber in their nearly transparent bodies, fins, and tails can be plainly discerned."

Plumbing Leakages.

Mr. Wm. P. Gebhard, an excellent authority on the subject of testing leakages in pipes, while preferring the water test for new buildings, considers the peppermint the best suited for old buildings. It is an extremely pungent essence, and being readily introduced into the pipes in a house, even by those who are neither plumbers nor sanitary inspectors, the slightest leak will be readily detected. It is well, however, that the party about to use it should, if not a plumber, know how it should be applied. The best place to do this is outside on the top of the roof, because if the odor should be released in a room or around a fixture, even for an instant, it would be impossible to detect a leak afterward. Whoever applies the peppermint should remain on the roof until the experiment is made, as he would otherwise carry the odor on his clothes into the house, and thus defeat the object of the test. Now, as to the best means for using the peppermint. Some pour an ounce or two of pure peppermint oil into a pail of very hot water, and pour it into the soil pipe, while others pour in the oil and follow it with hot water, taking care while the search is conducted below to cover the top of the soil pipe above the roof. There is thus no chance of escape, unless through leaks in the pipe, and a careful examination of every line of pipe, and around each fixture, will readily enable the investigator to determine, where, if any, there is a leak. Care should also be taken that while the examination is being made none of the fixtures shall be discharged, as otherwise the air in the pipes laden with the peppermint odor might find its way into the rooms.—*New England Stove Journal.*

Poisonous Fishes.

In the exhibition at Havre there is, says *Nature*, an interesting collection of specimens of poisonous fishes. Some are poisonous when eaten; others are merely venomous. Among the first are many sparoids, a tetrodon, and many *Clupea*, which are abundant near the Cape of Good Hope. In the Japan Sea is found a very peculiar tetrodon, which is sometimes used as a means of suicide. It brings on sensations like those produced by morphia, and then death. Another interesting collection in the exhibition is that of a number of bacteria and pathogenetic microbes. This collection was formed by Prof. Cornil, of Paris.

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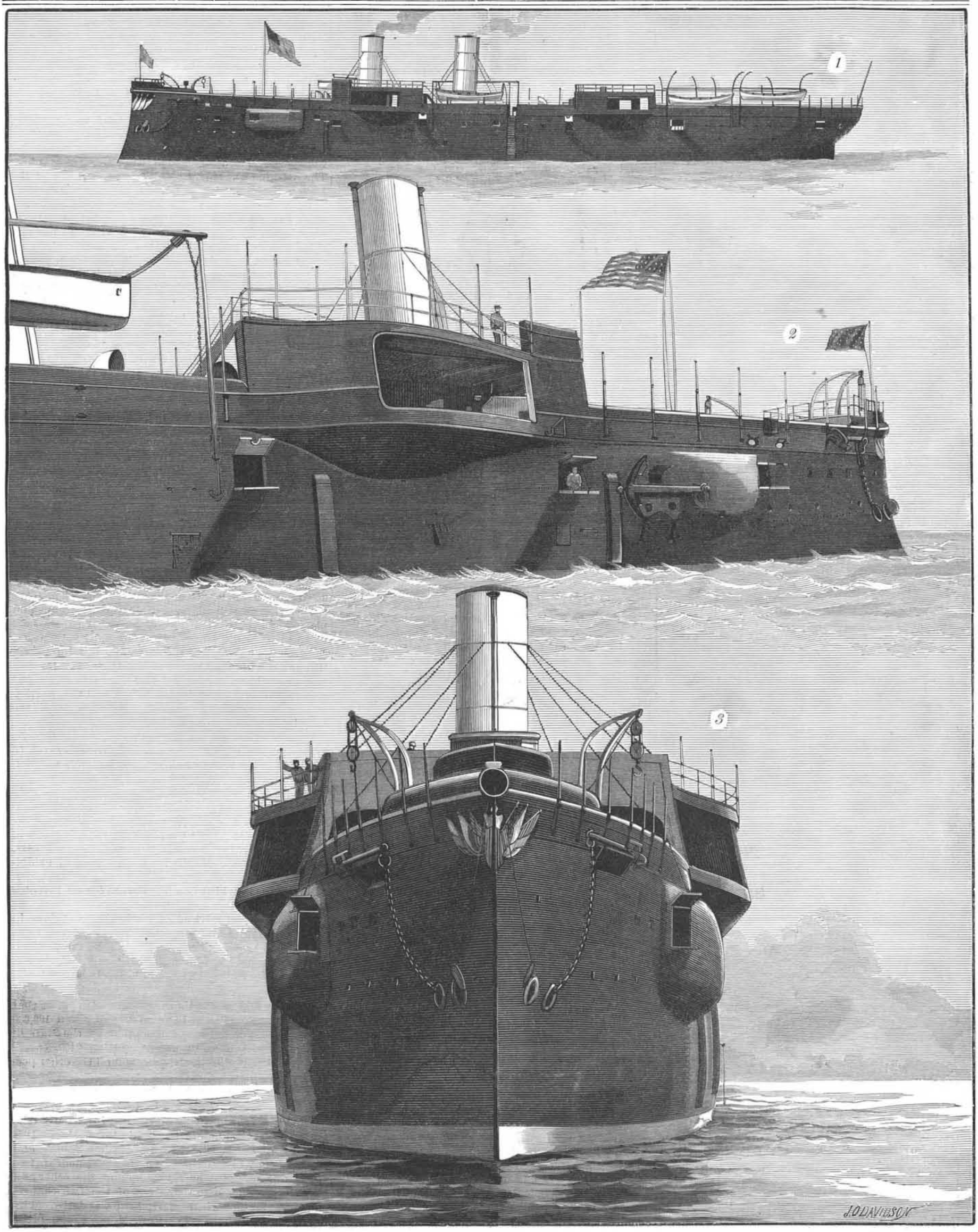

1. Side Elevation of the Chicago. 2. Side View of the Bow of the Chicago and Gun Bay. 3. Stem View of the Chicago.

ILLUSTRATIONS OF THE NEW AMERICAN WAR SHIP CHICAGO.—[See page 180.]