

NEW CHILIAN ARMOR CLADS.

The Chilian Government two years ago requested Mr. Reed, M. P., of England, to prepare a design for an armor-clad vessel whose tonnage should not be more than about 2,000 tons builders' measurement; to have 9 inch armor at the water line; to have several 12½ tun guns with great command of fire on bow, broadside, and stern; and to have a measured mile speed of from 12½ to 13 knots, with twin screws. To fulfil all these conditions, which were quite unprecedented in a rigged, seagoing ironclad, Mr. Reed prepared a design of a vessel of which the following are the leading features: The length between the perpendiculars is 210 feet, the extreme breadth is 45 feet 9 inches, the depth in hold is 21 feet 8 inches, the tonnage being about 2,032¾ tons (builders' measurement). The draft of water forward is 18 feet 8 inches, aft, 19 feet 8 inches, and the mean draft, 19 feet 2 inches. The height of the port sill from the load water line is 7 feet 6 inches. The armor is 9 inches thick at the water line, protecting the engines and boilers, 8 inches thick in wake of the gun slides, and of varying thicknesses elsewhere on the sides and on the athwartship battery bulkheads. The usual amount of taper is given to the thickness of the armor on the belt forward and aft. Behind the armor the teak backing is from 8 to 11 inches in thickness; with the ordinary arrangement of longitudinal girders worked on the two thicknesses of plates behind armor, the latter being supported by 10 inch frames placed vertically on the inside of the plates behind armor.

The armament consists of six 12½ tun guns, manufactured by Sir W. Armstrong and Co. These guns are placed in a central armor-plated battery, arranged as shown in our engraving. The peculiar recessing of the sides of this battery makes it possible for the two fore guns to command a range of 93°, namely, from right ahead to 3° abaft the beam—the two after guns to command a similar range of 93° from right aft to 3° before the beam—while the two middle guns command a range of 85°, extending between 20° from a right-ahead fire to 15° abaft the beam. It can also be easily seen from the sketch referred to that the three guns on either side can be readily combined in a broadside fire, while the four foremost guns can be worked so as to form a powerful combination for firing ahead. Altogether, then, every point in the horizon is commanded by these six guns in a small and compact battery.

The speed of the Almirante Cochrane, the first of two vessels recently completed, at the steam trial, was very nearly 13 knots, and this was easily sustained continuously when a strong breeze was blowing and the sea rough. Under favorable circumstances it is fully expected that the speed would be a little over 13 knots. The engines of the most modern compound type, of 500 nominal horse power, with horizontal cylinders, are manufactured by Messrs. J. Penn & Son, for both ironclads. The weight of the coal carried in the bunkers is 240 tons, and provision for additional coal is made.

These vessels are also supplied with a good spread of canvas, which is distributed, as shown in the engraving. This will allow them to be independent, to a certain extent, of their coals and machinery in going long distances, and they will have all the advantages that nautical men claim for sails to keep vessels out of the trough of the sea in case both engines get disabled. The chances of such an event happening are, however, remote. The chief object in providing the sails in these vessels is no doubt the saving that they effect in the coals; and as the rigging in no way interferes with the range of fire, as it inevitably must in a vessel with turrets, there were several reasons in favor of their adoption.

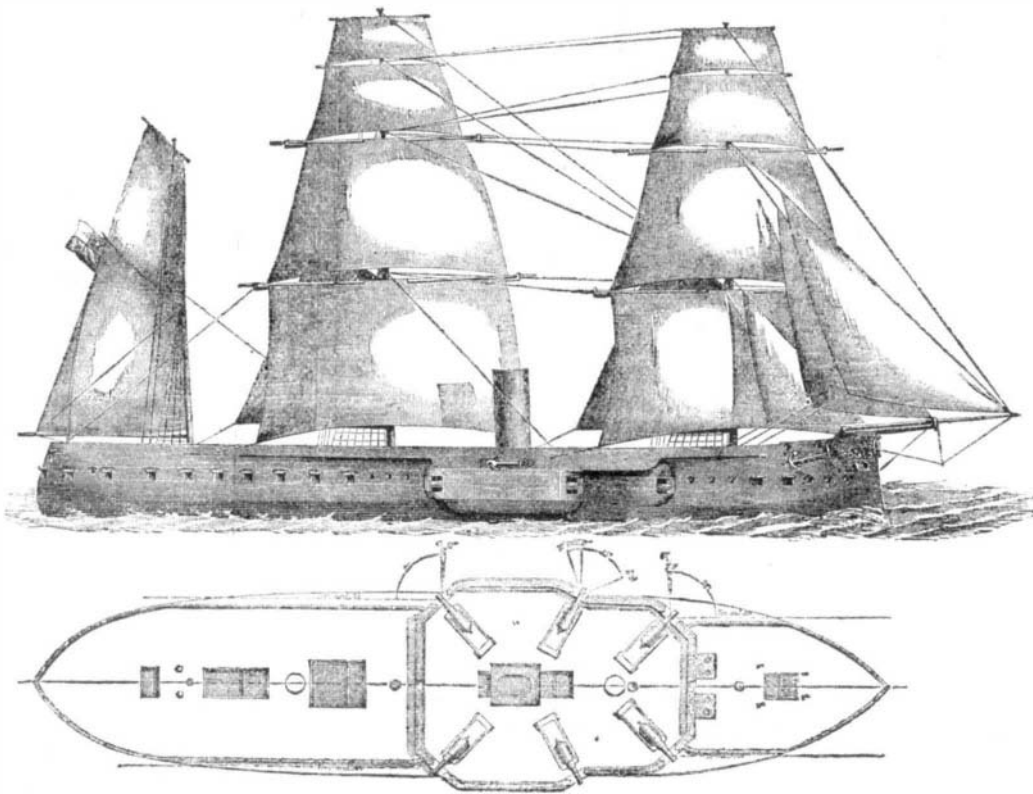
The hull of the vessel is built of iron upon the bracket frame and longitudinal system, and an inner bottom is fitted throughout the whole length of the engine and boiler room, as in the most recent ironclads of the British navy. The main deck outside the battery is plated with three quarters inch plating worked on the beams, the deck planking being worked on top of the plating. This gives protection to the magazines, shell rooms, etc., from a dropping fire.

A very interesting feature in the designs for these armor-clads is, that notwithstanding the double recessed form of the side at the height of the main deck, the top sides along the upper deck are so arranged that they present a fair curved line to the eye, and so improve the appearance of the vessel on deck, very much from what it would have been had the recesses of the main deck not been worked out. On the upper deck bridges, the eye sees only the usual fair sides of an ordinary ship.

All the compartments of the double bottom, says *Engineering*, from whose pages we select the engraving, are made watertight; the athwartship bulkheads are provided with watertight doors, the iron platforms are also made watertight, and pumps, in connection with a system of pipes, are fitted so as to command each and every watertight compartment.

Postal Palaces on Wheels.

Three cars, styled the "Palace Drawing Room Postal Cars of New England," have just been completed at Allston for the Boston and Albany Railroad Company. They are sixty feet in length, the longest on the road, are constructed of the choicest materials, are finished in hard wood in natural colors, and are provided with all the modern improvements ingenuity could suggest. A large and novel lamp, manufactured by the company, and having four burners and four large reflectors, is suspended from the roof of each car, giving ample light. About twenty feet in length of each car is partitioned as a store room for through mails, while the



THE CHILIAN IRONCLAD ALMIRANTE COCHRANE.

remaining space is divided into sections devoted to different purposes. The section in the middle is intended for letter sorting, another section is specially designed as a newspaper department, and still another section is used as a receptacle for bags, and is provided with racks, hooks, and other conveniences for facilitating the making-up of the mails. Each car is provided with water tanks and set bowls, similar to those in palace passenger cars. In the letter department of each car are four hundred and seventy boxes with wire netting bottoms, which prevent accumulation of dust, while the newspaper department of each has twenty-seven boxes, and the whole are labelled with the names of the postal stations and the principal postal routes in the country. When leaving Boston, these cars each require four clerks or route agents; but when returning to Boston, only two clerks are requisite. These cars make runs of four hundred miles a day, but the postal clerks only run half that distance a day.—*Boston Advertiser.*

MR. SETH GREEN'S NEW SPAWN-CARRYING DEVICE.

We mentioned recently a novel invention of the well known pisciculturist, Mr. Seth Green, by which almost any number of fish eggs can be safely transported and hatched in any spare room of a person's house, requiring but a pail of water daily and no special attention. The inventor states that spawn can be carried for a journey of one hundred and thirty days without loss or injury.



The apparatus consists of a simple wooden box, of a convenient size to be carried in the hand by means of the handle above. Its joints are covered with tin. Inside are numerous small trays made of wood covered below with canton flannel. The upper tray, shown in the foreground, is provided with a hinged cover of the same materials. The spawn is placed upon the bottom of the trays, together with moss or seaweed, and kept moist. The temperature of the room may

be so regulated that the spawn can be hatched in from fifty to one hundred and fifty days. Brook trout, salmon trout, white fish, and salmon eggs have been transported with success, over long journeys, by this means.

Vegetable Camp Followers.

Since the Franco-Prussian war it appears that a large variety of vegetation, formerly indigenous to Germany, has made its appearance and become acclimatized in French soil. No less than 163 new species have been found, and a remarkable conflict is going on between the natives and the invaders. The former, more robust and better suited to the climate, are defending their right to existence with much greater success than did the owners of the land on which they grow. On the plain of Bellevue, it is stated that, out of the great number of foreign vegetables which sprung up in 1871, hardly two species now remain. It is curious to compare this fact with the opposite condition of affairs in New Zealand and in the Pacific islands, where European plants are crowding out the aborigines, and even the people themselves are unable to hold their own against the stranger race.

The *Geographical Magazine* gives a number of remarkable instances in which vegetables have—as in the case first above noted—followed the movements of armies. Some of these examples are extraordinary and well worthy of more extended botanical investigation than they seem hitherto to have received. In their forays over Europe during the sixteenth and seventeenth centuries, the Turkish armies carried with them oriental vegetation. Up to the present day the ramparts of Pesth and of Vienna are covered with plants of Eastern origin. In 1809 a plant peculiar to the south and center of Europe, the *Lepidium draba*, commonly called whitlow grass, was introduced into England, where it was hitherto unknown, by English troops returning from the disastrous expedition to Walcheren Island, on the Dutch coast. A portion of the army was disembarked at Ramsgate, and the straw from their bedding was thrown into an old marl pit belonging to a Mr. Thompson. The plant grew and spread in great profusion over Thanet Island, where, for a long period, it has been known as Thompson grass.

In 1814 the Russian troops carried with them herbs from the banks of the Dnieper and the Don into the valley of the Rhone, and even introduced the vegetation of the steppes into the environs of Paris. Several of these species still exist, perfectly acclimatized.

In 1872 the attention of French scientists was called to the fact that a number of plants, belonging to the Algerian flora and which served as forage for the French army in that colony, had made their appearance about the camps in France. Near Strasbourg, 24 species peculiar to African soil were found in a single bale of hay mown in the vicinity.

The latest contribution to curious information on this subject is found in a recent paper by Sir Bartle Frere, in which he mentions that the date tree, which is found on the coast of Mekron, in Africa, is confined to a narrow region. Inquiry into this leads him to give credence to the tradition that the tree was brought thither by the soldiers of Alexander, after their return from India.

The Middle Park Coal.

Professor E. J. Mallett says it possesses much in common with the recently discovered mineral called *albertite*, a species of solidified petroleum, and also with what is known as *torbanite*. These two varieties are highly valued by gas manufacturers, who mix from five to twenty per cent of these bituminous compounds with less bituminous coal, thereby greatly increasing the yield and quality of the gas. It resembles the former in the large amounts of gas and tarry oil it yields (which may prove as valuable as that derived from *albertite*), but differs from it in being heavier—the specific gravity of the *albertite* being 1.090, while this is 1.323—also in yielding no soluble products when treated with bisulphide of carbon, spirits of turpentine, ether, etc. From torbanite it differs, in not crackling in the fire, in being much heavier, and in melting and intumescing when heated. Analysis shows it to contain in one hundred parts 6.02 per cent of water and moisture, 39.95 per cent of volatile matter (gas and tarry oil), 54.03 per cent of fixed residue, consisting of coke and ash.

A Collision in Mid-Air.

Land and Water relates a very curious incident of a collision between two wild ducks in full flight. Whilst recently shooting on the dykes in Norfolk, five ducks were flushed out of shot; and while the gentleman who was on the lookout for them was watching their flight, in the hope that they would pitch again, two of them were observed to come into violent collision, one falling to the ground. It was so completely stunned that it was picked up by the gentleman in question, who found it to be a fine mallard, which, on examination, was discovered to have lost one eye, it having been previously destroyed by accident or disease. No doubt the loss of this organ was the cause of the very singular occurrence.