

Two Wonderful War Ships.

Provision having been made in the British navy estimates for 1893-94 for the construction of two powerful first-class cruisers, to be named the Powerful and Terrible, *The Engineer* says it has been decided to invite tenders for the construction of the former as soon as the designs have been completed, leaving that of her sister ship until the next financial year. As these ships will be the largest and most powerful cruisers of their class ever built, the following particulars of them, which are open to modification, will be interesting to our nautical readers. The contemplated principal dimensions are as follows: Length, 500 ft.; breadth, 70 ft.; displacement at mean draught of 27 ft., 14,000 tons. The vessels are to be constructed of steel throughout, but as they are intended to keep the sea for lengthened periods, they will be sheathed and coppered. The proposed continuous sea speed in smooth water is to be twenty knots, but on the eight hours' natural draught trial the expected speed is twenty-two knots an hour. To secure the former each vessel will be fitted with engines and boilers capable of developing a power fully sufficient for actual requirements. For the protection of the vital parts of the ship, which include the engines, boilers, magazines, etc., they will be covered by a strong turtle-back deck of steel, having a maximum thickness of 4 in. amidships, reduced toward the extremities. Between this and the main deck, for the whole length of the engine and boiler space, these vessels will, like all the other first-class cruisers in the navy, be subdivided into numerous coal bunkers. At the normal displacement and draught of the ship—14,000 tons and 27 ft.—about 1,500 tons of coal will be carried, but provision will be made for a bunker capacity of 3,000 tons. The vessels will be propelled by twin—in preference to triple—screws, their efficiency within the limits of the proposed power and draught having been established by previous experience in our largest cruisers, as well as in the large twin-screw vessels of the mercantile marine. The armament of the vessels will comprise two 9.2 in. breech-loading guns, mounted at bow and stern as chasers, twelve 6 in., eighteen 12-pounders, twelve 3-pounder quick-firing guns, and several machine guns. The 9.2 in. and 6 in. guns will have armored protection, and the 12-pounder guns will be fitted with strong shields, revolving with the guns. Special study has been given to the protection of the guns and their crews and the transport of ammunition from the magazines to the guns. For the protection of the commanding officer in action an armored conning tower is to be erected at the break of the fore-castle. To

enable the bow and stern chase guns to be fought in heavy weather and to maintain speed at sea, an unusual height of freeboard at the poop and fore-castle, upon which these guns are carried, is provided. In addition to the guns carried by these vessels they will be supplemented by four torpedo dischargers, which will be submerged and placed in separate rooms.

Railway Schools in Russia.

There are in Russia special institutions called technical railway schools, for the special education of people for the railway service, viz., engine drivers, engineers, their assistants, road masters, etc.

At the present time there are twenty-eight technical railway schools, of which twenty-five belong to the government, and three which, although remaining private, are also under the inspection of the Ministry of Communication.

The pecuniary fund, which covers the expenses for maintaining the schools of the government, consists especially of sums which are paid to the Ministry of Communication by the majority of railways, to the amount of 15 rubles per verst of the railway lines open for traffic.

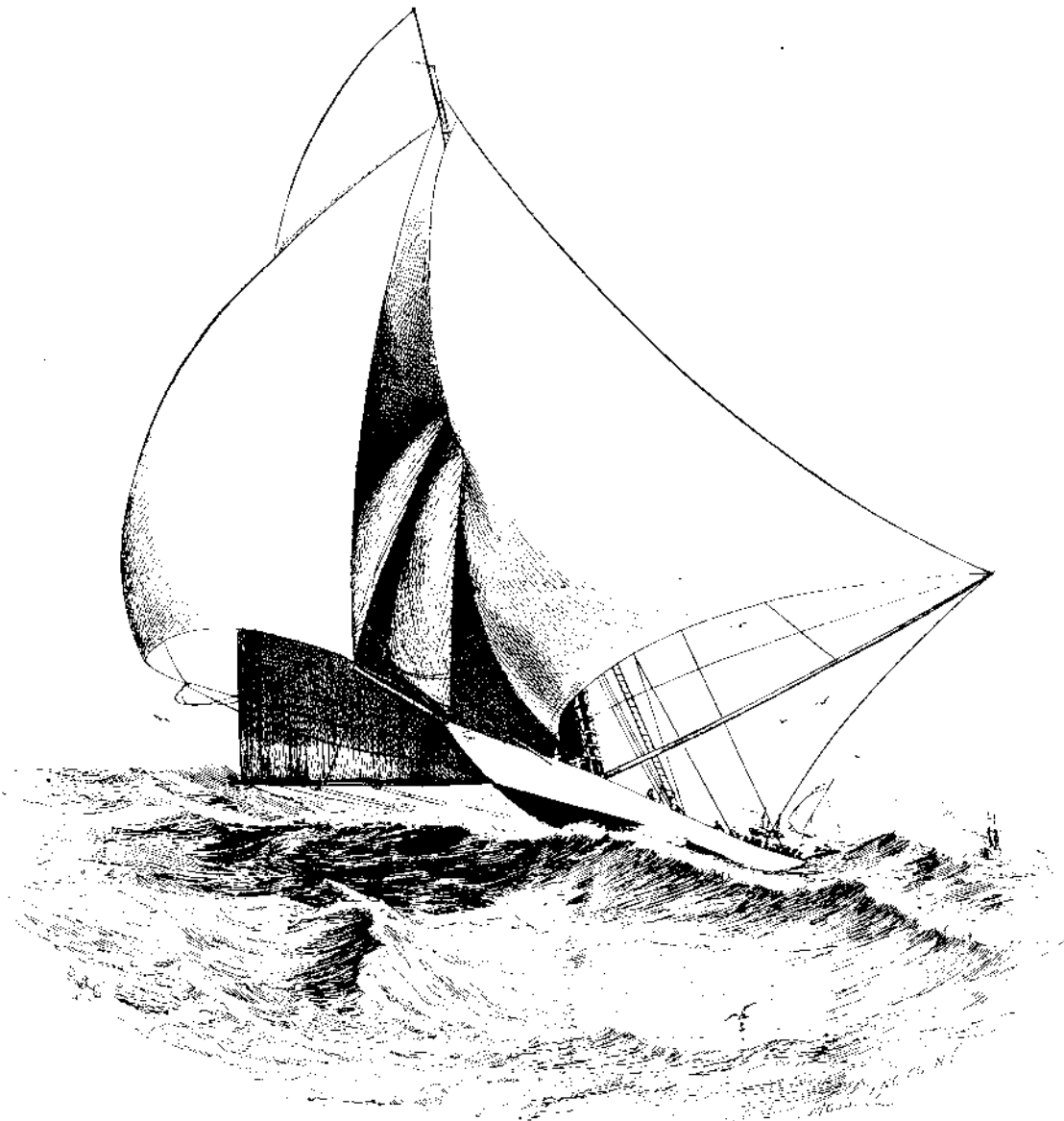
To this main source of income are added the annual payment of 10 rubles from every pupil, the sums realized by the sale of pupils' handiwork, useless property and materials, etc.

This fund, under the name of general school fund, consists at the present time of a capital of nearly 1,500,000 rubles and an income amounting to 500,000 rubles per year.

The annual maintenance of the twenty-five government schools costs more than 400,000 rubles.

At the root of the whole internal economy of these schools there is a strict discipline, as the employment for which the pupils are prepared demands, beyond a definite circle of knowledge and practical understanding, a particular punctuality in the execution of their service and a perfect subordination to discipline.

The whole course of instruction of the technical railway schools lasts five years, three years of which are for study in school and two years for practice on railways. During the three years of study in school there is taught: *a*, religion; *b*, elementary mathematics, with the fundamental knowledge of bookkeeping and land surveying; *c*, general knowledge of physics and practical knowledge of telegraphy; *d*, a short course of general and applied mechanics (descriptive); *e*, a short course in working wood and metal; *f*, elementary knowledge of architecture; *g*, practice of railway business; *h*, elementary and special drawing by hand and with the aid of instruments, as well as calligraphy; and *i*, handicrafts, as locksmiths', blacksmiths' and



THE AMERICAN YACHT VIGILANT.

joiners' work. Besides this there are introduced into the school singing and gymnastics.

Considerable attention is apportioned to practical training in handicrafts and drawing. The training in handicrafts is conducted by experienced teachers with special technical education in special teaching workshops.

After having finished the three years of study in class the pupils are sent off for two years' practical training on railways, where they work in workshops, in repairs of the line, on locomotives, partly on the telegraph, etc.

The annual number of pupils instructed in the railway schools amounts to above 1,500, and this number has increased of late.

The launch Daimler, built by the Daimler Motor Co., of 111 East 14th Street, New York City, has distinguished itself in the way of valuable practical service, besides affording one of the attractions of the Exposition. Six men sailing in a small yawl, about half a mile out in the lake, were capsized by a sudden gust of wind, and some of them, at least, would have been drowned, had it not been for the rapidity with which the launch reached and rescued them. On another occasion the launch had the honor of going out and towing in the Viking ship, when the latter was unable to make port on account of head winds.

The Chocolate Tree in Trinidad.

We learn that Mr. J. H. Hart, Curator of the Royal Botanic Gardens, Trinidad, has recently returned from a visit to Central America, after having successfully transported thither no less than twenty-five thousand plants of Trinidad cocoa. In return, he has conveyed to Trinidad two highly desirable varieties of the *Theobroma cacao*, and two species new to that colony, and already numerous plants of each are thriving well. One of the varieties is a purely white-seeded one, producing large pods and splendid beans, which require only forty-eight hours' fermentation instead of the ten days usual in Trinidad. The second variety, known in Nicaragua as "alligator cacao," is peculiar from the soft covering of its pod and the raised instead of indented sectional ribs. The new species are *Theobroma bicolor* and *Theobroma sp.*, the latter known as "cacao meco," "cacao mono," or "monkey cocoa."

THE YACHTS CONTENDING FOR THE INTERNATIONAL CHAMPIONSHIP.

The series of races in which the Valkyrie, as the British champion, in competition with the American yacht Vigilant, is endeavoring to win back the prize cup originally won in England by the yacht America, has attracted more attention than any other competi-

tion of the kind which ever engaged the attention of the yachting world. It has also excited to a remarkable degree feelings of international rivalry, happily of an altogether friendly and amicable nature. Our illustrations represent the rival yachts under sail, one of the views also showing the Valkyrie out of water in drydock, bringing out her full lines.

As announced by the official measurer of the New York Yacht Club, the dimensions of the two yachts are as follows:

Vigilant—Length on load water line, 86.19 feet; from end of boom to forward side of mast, 99.37 feet; from fore side of mast to end of jib stay, 73.80 feet; from fore side of mast to jibtop-sail stay, 75.90 feet; from fore side of mast to forward point of measurement, 74.85 feet; from fore side of mast to outer end of spinnaker boom, 74.62 feet; deck to upper side of main boom, 3.08 feet; deck to topsail halyard block, 125.96 feet; deck to hounds, 69.08 feet; length of topmast, 56.88 feet; length of gaff, 54.76 feet.

Valkyrie—Length on load water line, 85.50 feet; end of boom to forward side of mast, 92.60 feet; forward side of mast to jib stay, 66.16 feet; fore side of mast to jibtop-sail stay, 66.16 feet; fore side of mast to forward point of measurement, 66.16 feet; fore side of mast to outer end of spinnaker boom, 7.2 feet; deck to upper side of boom,

3.08 feet; deck to upper side of topsail halyard block, 114.86 feet; deck to hounds, 63.30 feet; length of topmast, 51.56 feet; length of gaff, 55.57 feet.

Figured from the above, their measurements are reduced to the following:

	Vigilant, Feet.	Valkyrie. Feet.
Sail area	11,272	10,042
Ordinary racing measurement	96.18
International racing measurement	96.78	93.11

Vigilant allows Valkyrie 1 minute 48 seconds in a race over a thirty mile course.

A technical expert, Mr. Irving Cox, makes the following comparison of the two boats, which we condense from the *New York Sun*:

The two vessels represent very different principles in yacht designing. The Vigilant depends for her speed on moderate displacement, extremely easy lines, great stability, due to excessive beam, and light weights aloft; the Valkyrie on narrow beam, fine entrance, and stability, obtained by a powerful bilge, very low lead, and light hull. The Vigilant for holding on to windward depends on good draught, a perpendicular keel, and a centerboard. The Valkyrie expects to accomplish the same object by means of excessive draught, a great deal of vertical keel, and by the form of the vessel's side when keeled. The Vigilant has a centerboard weighing 3 tons, 20 feet