

The Royal Navy.

This column will be devoted to articles, compiled and written specially for this paper by an Englishman, and we hope they will prove both interesting and instructive to our readers; in fact we are sure they will, as every Englishman takes a great interest in the means by which we have for long ages held our supremacy. Notices and descriptions of all new ships built will from time to time be given. The same gentleman has also promised to give us some descriptions of great engineering works in which Englishmen have distinguished themselves.

WHAT THE NAVY COSTS.

The Royal Navy costs Great Britain from \$60,000,000, to \$72,000,000 a year; this includes half pay, pensions &c. which make up \$10,000,000. Including the marines there are 65,400 officers and men on the ships books.

The pay of effective officers and seamen is: an Admiral \$17,000 to \$19,500 including allowances; a Vice Admiral, \$12,500 to 15,500 according to the station; Rear Admiral 8,000 to 13,000; the salaries range right away down to the seamen who get from \$90 to \$150 a year, and boys from \$45 to \$90. A Chief Engineer receives \$1,150 to 2,000; with extras this is about the same as a Staff Commander and Navigating Lieutenant; Assistant Engineers get about from \$550 to \$800; Stokers receive \$150 to \$180 and carpenters \$500 to \$800.

The number of ships in commission is about 210 of all classes. Very few people have any idea of the money required to build a modern war-ship. *Agamemnon*, finished in 1885 cost over \$3,000,000, the *Colossus*, 1886 cost about \$4,000,000; the *Edinburgh*, *Collingwood*, *Imperieuse*, *Benbow*, *Camperdown*, and a host of others, finished since 1886, cost from three to four millions dollars. Where this has been paid one would think they would run for a long time without needing any more spending on them for repairs, but this is by no means the case, the ratio of the annual increase is a rapid one, the first year or two from \$1,000 to \$10,000 a year is all they require, but when they get from 10 to 20 years old the cost is enormous; the *Hotspur* built in 1872 cost \$800,000 and has since cost \$850,000; the *Alexandre* built in 1877, \$3,250,000, repairs since that time \$550,000; these are only a few examples, but they show that keeping ahead of any three combined navies in the world, is no easy or inexpensive matter.

Although we excel in tonnage, horse power and men of course, our ships are built in a more substantial manner, and the machinery—no small matter in a modern war-ship—is altogether more substantial and reliable than any foreign built vessels.

Of ships now building for the navy, the *Royal Sovereign*, launched a few months ago by Her Majesty; the *Hood*, which will be ready for launching this month; the *Ramilies*, *Resolution* and *Revenge* are five first-class battle ships all well on in construction are 14, 150 tons displacement and have engines of 13,000 horse power, magnificent vessels! the type will be described at a future time.

There are four first class cruisers now near completion; the *Endymion*, *Gibraltar*, *Edgar* and *Havcke*, the *Endymion* was launched on the 22nd of July, the *Edgar* is already completed and her trial trip will or perhaps has been run before this goes to print; these vessels are of 7,350 except the *Gibraltar* which is 7,700 tons caused by sheeting of wood and copper, and are all fitted with engines of 12,000 horse power. The second class cruisers under construction will be described next month.

A WONDERFUL SHIP, H. M. S., "VULCAN."

After a long series of delays, owing to various causes, the *Vulcan*, protected torpedo depot ship, has been successfully subjected to an eight hour steam trial, under natural draught, at Portsmouth. She was laid down in June, 1888, from designs by Mr. W. H. White, C. B., and was launched twelve months afterwards, and, though she is equipped with a complement of twenty quick-firing guns, she was specially built as a floating factory and laboratory for torpedo and mining service, and for the conveyance of torpedo craft for the use of a fleet. She is provided with two powerful swan-neck hydraulic cranes hoisting in and out torpedo boats, of which she carries six on her superstructure deck, besides a couple of countermining barges and a steam pinnace. On her main deck is a factory or workshop, well stocked with planing, drilling, shaving, turning, and

slotting machines, together with a furnace, which will enable small castings to be made on board; while on the deck below are storage spaces for submarine mining gear, gun-cotton, and other explosives, and the usual powder magazines. She is also provided with two submerged torpedo stations and four tubes for discharging Whiteheads above water. Her displacement is equal to 6,020 tons, and though her lines are exquisitely beautiful and curved throughout, the height and sweep of her cranes and the amount of top hamper carried give her an extraordinary appearance in the water. She has been fitted by Messrs. Humphrys, Tennant & Co. with a set of vertical triple-expansion engines of the same type as those supplied by the same firm to the *Royal Sovereign* and other battle-ships of the class. The cylinders are of the diameters of 46 in., 50 in., and 88 in., with a stroke of 4 ft. 3 in. Steam is supplied by four double-ended boilers with 24 furnaces, with a working pressure of 155 lbs. to the square inch. The condensers have a total cooling surface of a 11,000 square feet.

It may be interesting to point out in order to enable one to understand what a crowded box of machinery the *Vulcan* really is, that, in addition to her main propelling engines, she is provided with four circulating engines, four fire engines, one drainage engine, two turning engines, two auxiliary engines, two starting engines, one steering engine, five feed engines, 12 fan engines, one workshop engine, four ash-hoists, one capstan engine, three electric lighting engines, two hydraulic engines, and four air-compressing engines, making a total of 50. To these must be added 10 water engines, viz., four bollard, two slewing engines, and four for hoisting, besides the 33 engines of various kinds with which the small craft she carries are equipped. So that, exclusive of her complement of machines, the *Vulcan* is provided with no fewer than 93 engines worked by steam and hydraulic power. Her speed is 18½ knots an hour with natural draught, which will enable her to keep up with the fleet at all times.

THE ROYAL NAVAL EXHIBITION.

One of the most interesting and instructive of modern exhibitions, is that now being held in England, the Royal Naval Exhibition.

There it is that we can see almost at a glance the cause and the growth of England's greatness. Models of the old wooden ships; Nelson's flagship the *Victory* is there in full size, and fitted up in exactly the same (or as near as existing records make it possible), it was constructed from the original plans. The *Victory* still exists and is used as a training ship but almost every portion of it has been renewed, and made to meet the requirements of modern ideas and conveniences, so that it is like the old man's knife that belonged to great grand-father but which had the blade renewed several times and once had a new handle put to the blade; so this model is exceedingly interesting to Englishmen, almost the greatest attraction.

Here we can see the growth of the marine engine from the time when the low pressure engines working with 5lbs of steam up to the modern quadruple expansion engines working with a boiler pressure of nearly 200lbs to the square inch.

There is a small lake in the grounds where electric launches are in working order and on which takes place a mimic battle between two models of different types of modern warships.

Electricity is well represented showing that Englishmen are not at all behind in this, one might say, new science; notwithstanding all we hear from the States.

The exhibition is a financial success and a considerable balance over work-expenses has been realized which will be handed over to charitable institutions.

AN AMERICAN VIEW OF THE NAVY.

Details of the great naval review which took place during a recent visit of the German Emperor to England, are coming to hand, and fully explain the wonder expressed over the strength of the British fleet. The Emperor from his yacht saw a line ten miles in length of the fastest and best-armed vessels in the world file past him with the regularity and precision of a series of infantry platoons. Included torpedo-boats, there were 113 ships of war, twenty of which were heavy-armed battle-ships, twenty-nine cruisers and commerce destroyers, and the remainder gunboats and lighter vessels. Not counting the machine-guns and smaller ordnance, these vessels, carried 558 high-power guns, among them 69-ton and 80-ton guns, while the force necessary to man and

handle the ships and armament amounted to 21,107 men.

Yet while this vast naval force was parading at Spithead, the British navy was maintaining its patrol of the seas as usual, and in every quarter of the world guarding the political and material interests of the British Empire. At the same time war-vessels of all descriptions were tied up in dock yards and harbors, wanting but little to fit them for active service, while they were in process of construction a series of battle-ships which it is expected, will, within three years, double the efficiency of the navy. More than that there were sailing in the Atlantic, Pacific and Mediterranean British merchant fleets which, at the first note of war can be converted into commerce protectors, leaving the regular navy for more serious service.—*American Ec.*

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