AN EXTRAORDINARY WAR SHIP.

The torpedo ram *Polyphemus* now being constructed by the British Government, will be, when finished, entirely different both in form and structure from any other vessel heretofore built, and her weapons of attack are such that, whenever brought into action, she must be fought differently from any other war vessel. The *Polyphemus* is to have a powerful ram bow, an efficient torpedo battery, high rate of speed, handiness, moderate size, and but small extent of surface above the water exposed to the enemy's fire, such portion of the vessel as is above the water-line being convex in form, so as to deflect any projectile that may strike it. The appearance of the vessel at sea will be that of a cylinder floating on its side and deeply immersed, tapered at the ends to form a bow and stern. The top of the cylinder will be 4 ft. 6 in. above the water-line, and will be flattened over a large portion of its area to form a deck, which deck will be plated over with steel-armor, thus covering in and protecting the ship and all her machinery and fighting appliances. The ship proper as she will thus appear will be surmounted by a light structure carrying a hurricane deck about two-thirds her length, and upon this deck will be seen a signal mast, pilot tower, boats, etc. The form under water of the *Polyphemus* is as strange as the portion above. The sides are curved cylindrically for several feet below the water line and are armor-plated to that depth. Below this point the section assumes a ∇ form and ends in a sharp angle at the keel. Consequently a cross-section of the vessel is similar in form to a peg-top. The flattened convex curvature of the upper part of the peg-top would represent the part of the vessel above water, and the lower portion, which ends in a point, would represent the part of the ship that is below water. The *Polyphemus* is 240 feet long, between perpendiculars 40 feet in breadth; load draught 20 feet. She will carry no masts or sails, but simply a pole for signalling purposes or for making observations from. She will have two pair of high-pressure compound horizontal engines with twin screw propellers. Each high-pressure cylinder will be 38 inches in diameter, and the low-pressure 64 inches. The stroke will be 45 inches. The boilers, 12 in number, will be of locomotive type, and made of steel. The engines are 5,560 horse-power, and the speed is expected to be 17 knots. The *Polyphemus* will carry no guns, except a few light shell guns and Gatlings on the hurricane deck for repeling boat or torpedo attacks. Her only weapon will be her ram-bow and Whitehead torpedoes. The ram will project 12 feet in advance of the stern of the ship, and is so placed as to strike several feet below an enemy's armor. The spur is being fitted so that it may be unstripped from the stern when not required for active use. Under the ram is a torpedo port, which will enable Whitehead torpedoes to be ejected right ahead of the ship. There are also two torpedo ports on each side amidships, for ejecting torpedoes on the broadsides. All the torpedo ports are below the water. The under-water attack will be supplemented by torpedo firing from the armored deck above water, the same as in ordinary torpedo-launches. Communication is made between the hurricane deck and the interior of the ship by openings cut through the armored deck, which openings are protected by glacis plates and armor, and by casings which are carried up to the hurricane deck. On this deck the boats are carried, and the ship is steered and worked from it. An armored pilot tower, with protected means of access to the lower part of the ship, is placed at the fore end of hurricane deck and fitted with steering wheel, telegraphs, apparatus for firing off the torpedoes, and all other appliances for coursing and working the ship. The *Polyphemus* is built throughout of steel; the frames of Bessemer, and the bottom plating of Landore-Siemens steel. The lower part of the ship has been subdivided into as many watertight compartments as possible. The cabins and accommodation for the crew will be all below the armored deck, and will be ventilated artificially, as in the iron-clad monitors. They will be lighted throughout by the electric light. An electric light will also be placed in the look-out on the polemast for reconnoitring and signalling purposes. The most novel feature in the ship is the arrangement of the keel. The bottom plating on each side, instead of ending in a keel or flat keel-plate at the middle line, is formed into a recess, or that in place of the usual keel there is a rectangular groove, 1 foot 8 inches wide and 3 feet deep, taken out of the bottom of the ship. This groove is intended to be filled with cast iron ballast up to a weight of 300 tons. The ballast will be so attached to the ship that in the event of a compartment becoming bilged, and it being necessary to lighten the ship, the ballast can be let go and dropped from any part as may be required. The draught and trim may thus be regulated to a certain extent, should the vessel be damaged in action. The ballast will be carried to keep the ship down in the water so as to prevent the deck becoming too much exposed, when in action, to the fire of an enemy, but should she become further emersed from any cause, the dropping of the ballast will relieve and lighten her. The *Polyphemus* is expected to be ready for launching in a few months.

A NEW PORTABLE STEAM TRAMWAY.

The first of a series of experiments with a new portable steam tramway, invented by M. Decanville, and further developed by Messrs. J. Fowler and Co., took place recently in the garden of Stafford House, by the permission of the Duke of Sutherland. Among those present, all of whom appeared to take great interest in the proceedings, were the Turkish Ambassador, the Chinese Minister, the Secretary to the Japanese Legation, General D. Lysons, Sir J. M'Garel Hogg, Sir Charles Reed, and Earl Granville. The main items on which the success of portable railways seem to depend are that the weight of all the pieces, including wagons, shall be kept within such a limit that each piece can be removed by men without the aid of mechanical appliance, and that each piece shall be complete in itself without any loose bolts or spikes, or fish plates. These conditions are fully observed in the new invention. The most important advantage of this new railway is that the rails are rigidly fastened to the sleepers and joint plates; thus the line can be laid down anywhere, taken away, and relaid with great expedition and without the employment of skilled labour. Iron rails have been found not to answer, from their bending under the action of a load when laid on uneven ground, and steel has therefore been employed. The railway is perfectly portable, since it can be laid down and taken up without the help of any tool whatever. To give an idea of the facility of these operations where frequent removals are necessary —that is to say, in clearing land of beetroot or sugar cane, &c.— it is stated that four men can take up 400 yards of railway and relay them 30 yards further on in less than an hour. It is also urged as an additional recommendation to the new railway, that it is not merely suitable for being worked by steam power on a level, but that on steep inclines, or when steam power is not readily attainable, horses and camels can easily supply the necessary motive power. It is asserted that on such a line a camel could haul a load of about five tons, whereas it can only carry about 350 lbs. The railway is meant for not only agricultural but also for military purposes, and in India especially it is supposed it will be particularly useful.

HOW THE ANCIENTS ENGRAVED GEMS.

A writer in *Harper's Magazine* for September says:—We must remain as yet some little in doubt as to the methods employed by the old artists to perfect these miracles of taste. We have, however, the absolute certainty that these ancient masters were familiar with the diamond, and that their best work was made by using this, the hardest of all substances, as a tool. A splintered fragment of the diamond served as a scraping tool, and they were well acquainted with the drill. Prehistoric man worked a drill at the very commencement of his existence. A Phœnician gem—a lion attacking a bull—shows how the drill was used. A number of circular depressions are found in the gem which mark the extremities of the figures. This was done not for the sake of effect, but to show the artist the limit of his work as to depth. After the holes were sunk, the artist untied the various portions of his work by scratching. Now the use of the diamond point or splinter, fixed in a style of iron socket, allowed a certain flexibility of handling which our modern processes of gem-engraving do not permit. To-day the work is done by means of a minute rotating disc of copper, which is whetted with oil and diamond dust. On the least application of the substances to be cut to the disc, it is the disc which bites into the stone. The difference of manipulation is, then, that to-day it is the stone which goes to the tool, and not, as in olden times, the tool to the stone. It is more convenient, then, in 1879, to bring the cart to the horse. It can now be readily understood why, in modern work, time and labour being spared (the art-conception not entering for the present into the subject), why this work of to-day is inferior to the art which is past. It is purely a mechanical process now, for a rotating disc will no more draw lines which have feeling than will photographing processes paint pictures. It has been stated that we are not entirely acquainted with the methods employed by the old glyptic artists. This becomes quite evident from this fact, that their best work seems to have been both cut and polished