THE DYNAMITE CRUISER VESUVIUS.

The dynamite cruiser Vesuvius, launched from Cramp's ship yards at Philadelphia on April 28 of the present year, is now rapidly approaching completion. In a few weeks she is to be ready for her trial trip. The general details of her interior arrangements, disposition of boilers, engines, armament, etc., are shown in the illustrations. She is a vessel of as distinctively new a type as were the monitors of the days of the civil war.

The Vesuvius is a steel ship of 725 tons displacement, 252 feet long over all, and 26½ feet wide. She is without masts, and practically unarmored. She draws a maximum of nine feet of water; the mean draught is eight and one half feet. Her engines, which have been already illustrated and described by us,* are of four-cylinder, triple-expansion type. They actuate twin screws, and are designed to give a speed of at least twenty knots an hour. Her model is naturally characterized by very fine lines, and the boilers and engines are expected to develop 4,000 horse power.

In the forward part of the ship the three pneumatic guns that form her armament are placed. These are built into the ship. Their muzzles are carried forward and project above the deck near the bow. Originally, 16° was chosen as the degree of elevation, but this has been increased to 18° to avoid ricocheting. They are 15 inches in diameter, fifty-four feet long, and are made of thin cast iron. They are not rifled, the vanes upon the projectile being relied on to give any desired axial rotation.

The full-sized shell for this gun is 14¾ inches in diameter, and its body is about seven feet long. Back of the body is a tail fitted with spiral vanes, which secures its alignment and rotation. The body is made of thin drawn brass tubing, and will hold 600 lb. of high explosive, dynamite or gelatine, the whole weighing about 1,500 lb. when charged. This is the largest shell the gun can fire, and the effects of such a heavy charge of explosive can only be surmised. The destruction of the Silliman, one mile distant from the gun, was accomplished with fifty-pound charges. The Vesuvius is to throw torpedoes containing twelve times this quantity. Should one explode in the air over a ship, the effects of the concussion on her crew would probably be very disastrous. According to the opinion of students of torpedo practice, the submarine explosion of such a shell would destroy a ship twenty or more feet distant.

By a recent improvement the range of adaptability of the guns is greatly increased. Sub-caliber shells can be fired with accuracy, and give an increased range. Thus with the fifteen inch gun built for the Italian government the following ranges have been attained:

Full	caliber	projectile	weighing	1,029 lb.	18° elev.	1,160 yds.
Sub	"	"	"	950 "	25 "	1,644 "
"	"	"	"	155 "	18 "	3,452 "
"	"	"	"	300 "	10 "	2,804 "

The two last projectiles were eight inches in diameter.

The air for discharging the projectiles is compressed by two Norwalk compressors into reservoirs consisting of a number of tubes. These are made of wrought iron, 16 inches in diameter, and thirteen-sixteenths inch thick. The heads are concave and are welded into place, and the ends are then reduced in size to still further increase the strength. Some of the tubes are twenty and others are twenty-five feet in length. As will be found on calculation, each lineal foot corresponds pretty closely to one cubic foot capacity. The firing reservoirs contain 210 cubic feet of compressed air, the storage reservoirs contain 420. It is proposed to store the air at 2,000 pounds pressure per square inch, the compressor being able to deliver 140 cubic feet of air at that pressure every hour. The firing reservoir is to be maintained at a pressure of 1,000 pounds. Each shot at one mile range reduces its pressure 150 pounds. This deficit is immediately supplied from the storage reservoir.

Under the rear of each gun are placed two "revolvers" in line with each other. Each contains five chambers, for holding as many torpedoes. To load a gun, its breech is dropped, swinging downward on a pivot at its extreme rearward end. The opening points forward and comes directly opposite and in line with the lowest chamber of the after revolver. By a hydraulic ram the shell is pushed into the breech, which is at once swung upward, again completing the continuity of the barrel. The revolver is then turned one division, so as to be ready for supplying a second shell. When the after revolver is empty it is filled from the forward one in the same way. All these maneuvers are executed by hydraulic power.

Thus for each gun ten projectiles are provided, giving a total of thirty. This is the full armament of the ship as far as torpedoes are concerned.

The guns are provided with two valves. One is the graduated firing valve, the other is the throttle valve. It was thought that by adjustable reduction of area by a fixed valve, in addition to the firing valve action, more accurate results as to range might be attained.

* See SCIENTIFIC AMERICAN, May 19, 1888.

The ship is steered by steam. All of her operations will be directed or executed from a conning tower placed on her deck. The tower is protected by light armor. In firing, the guns have a fixed elevation. Their range is varied by admitting more or less air. This is effected by the firing valve, which is constructed so that any desired amount may be used with certainty. The pointing of the guns is to be executed by the movements of the vessel. The officer in the conning tower will have under his control the ship with her guns to be trained upon the enemy, in the same sense that an artillery officer moves his gun carriage about so as to point in the desired direction the piece it carries. The hull of the Vesuvius represents a gun carriage carrying three pneumatic guns.

The contract requirements are that the ship shall have a speed of twenty knots per hour. The guns are to be able to throw a projectile containing two hundred pounds of explosive a distance of one mile. One shot each two minutes is to be fired for nine shots. The guns are to be of sufficient accuracy to drop the projectiles within a parallelogram fifty feet wide and two hundred feet long.

An item of interest in connection with this matter is the appropriation by Congress of $400,000 for pneumatic guns for the United States army. Ten guns will probably be built, to be mounted for coast defense. The colony of Victoria, Australia, and Italy have ordered them, and other governments are in negotiation with the pneumatic gun company. In case of war with a foreign power it seems probable that the United States would have to meet these weapons in the enemy's ranks. She will not be allowed to monopolize so deadly a weapon.

How the Tiger Kills and Eats.

In a paper read before the Bombay Natural History Society recently, and published in its journal, Mr. Inverarity, a noted *shikari*, discussed the habits of the tiger, and especially the mode in which it kills and eats its prey. Some think he seizes by the throat, others by the nape of the neck from above.

Mr. Inverarity has examined scores of slain animals with special reference to this point, and in every case but one the throat was seized from below. The exception was an old boar who had been seized by the back of the neck from above. One of a single file of villagers who was once seized by the nape of the neck by a man eater, but saved by his companions, had no idea when he recovered his senses what had happened. Whether dislocation of the neck takes place is doubtful.

The tame hunting leopards always kill by pressure on the windpipe, without breaking the skin; possibly the tiger kills in the same way. It is only by accident, if at all, that tigers in killing sever any important vein or artery, and no blood to speak of flows from the throat wounds. Very large and powerful animals like the bull, buffalo, and bison, if attacked at all, are in the first instance attacked from the rear, with a view to disable them.

Having killed, the tiger almost invariably begins eating a hind quarter, consuming one or probably both. Sometimes he leaves the stomach and intestines as they are; sometimes he will remove them to one side, making a neat parcel of them. A tiger and tigress together will finish an ordinary sized animal at one meal, leaving only the head. In this case it is probable that the second begins at the fore quarter. Animals are never eaten where they are killed, but are always dragged a short distance. They are not lifted clear of the ground, but dragged.

Having gorged himself, the tiger sometimes lies close by his prey, but if it is hot weather and there are hills in the neighborhood, he will go a long distance off before resting for the day. He prefers to lie in a cool cave or in a breeze on the hill side than in the close, hot jungle

He returns next night and finishes what is left, but he never eats a second time on the same spot, dragging the remains of the prey 40 or 50 yards off. Sportsmen coming on a half-devoured animal and desiring to catch the tiger, tie the prey to a tree. The tiger takes about two hours' steady eating to finish the fore quarters of a bullock.

Mr. Inverarity sat over a small tigress one night who ate for ten minutes, then went away for twenty, probably to drink, and on her return ate steadily for two and a quarter hours. He did not fire, as he could not see her.

Tigers are cannibals; they will make their meals off each other. They are supposed to kill once in five or six days, and no doubt the tiger after a heavy feed does not care to hunt much for a few days; but a tiger kills whenever he can. They have been known to kill on fourteen consecutive nights.

Mr. Inverarity believes that animals killed by tigers suffer little beyond the panic of a few seconds. The shock produces a stupor and dreaminess in which there is no sense of pain or feeling of terror. The powerful stroke of the fore paw of the tiger is a fiction; he clutches with his claws as one might with the fingers, but does not strike a blow.

Tigers wander immense distances at night, and, as they like easy going, they go on roads and paths. They do not like to move during the heat of the day, as the hot ground burns their pads and makes them raw. They can on occasion climb trees.

In Salsette one climbed after a certain Pandoo, but could not reach him, and retired. Pandoo, thinking the coast clear, got down and ran toward home, but on the way was caught by the tiger and killed.

The inquest report stated that "Pandoo died of the tiger eating him; there was no other cause of death. Nothing was left except some fingers, which probably belonged to the right or left hand." Natives have a belief that the ghosts of the man-eater's victims ride in his head and warn him of danger, or point the way to fresh victims.

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