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VII. MECHANICAL ENGINEERING .- Snyer's Eastic Coupling .-

THE LATEST ARMOR TRIAL AT INDIAN HEAD. at the Naval Ordnance Proving Ground, at Indian seashore hotel, now so often overshadowed by at least Head, which resulted in the provisional acceptance a suspicion of unhealthfulness. In many cases houses of about 370 tons of nickel steel armor from Carnegie, in the country depend upon rain water for the supply. Phipps & Co.

tower of the Indiana, was an 8 inch barbette plate for the Oregon. Its curve subtended an arc of 120° | pleasant taste, which is traceable to no visible or dison a radius of about 8 feet; it was 10 feet 7 inches cernible impurity. horizontally and 5 feet 4 inches high, secured to an 20 per cent.

The gun was a modern 6 inch breech-loading rifle, mounted on a central pivot carriage, at a muzzle distance from the plate of 61 feet.

The projectile used was a Carpenter armor-piercing shell weighing 100 pounds.

First Round.-Charge of powder, 37.84 pounds. Dupont's brown prismatic; striking velocity, 1,762 f. s. This round was for the premium cracking test, the get through, and the plate must not show through cracks to the edge.

The point of impact was 21 inches below the upper edge of the plate and about 18 inches to the right of the medial line, the impact being practically normal.

The projectile struck the point aimed at, got its nose just through and rebounded to the gun platform. where it was picked up near the carriage. The marks on the oak planking showed a spiral movement of the swell, disclosing a grain of finest metal.

The plate was not cracked and showed no other damage than the hole of impact, the edges of which were turned up with a fringe 2.35 inches high. This round decided the acceptance of the plate for the cracking test, but it failed to win the premium cracking test.

Second Round.-Charge of powder, 48.3 pounds ; striking velocity, 2,012 feet per second. This round was for the premium perforation test. The shell must not penetrate the backing. The premium offered was \$30 per ton for the whole group represented by the plate.

The shot struck the plate 21 inches to the left and The plate was not cracked, and showed only a clean, fringed hole.

W. T. Sampson, the Chief of the Bureau of Ordnance, ing organic matter. and a number of prominent steel men and ordnance officers. The Carnegie Company was represented by Mr. Hunsecker and their naval agent, Lieut. Stone.

THE PUBIFICATION OF WATER IN WELLS AND CISTERNS.

We have recently described and illustrated an electric purification process for water from the Croton watershed. The existence of vested rights therein involving the disposal of sewage by villages or individual houses has made this object hard to attain, Tracing one source of contamination to a restricted area, the purification process we have alluded to has been applied thereto with considerable success. The process virtually amounts to treatment of the water with hypochlorites and other highly oxidized salts. These decompose the offensive organic matter and make the . 14754 water quite innocuous.

Lin de f

tary sense, how much easier an object of attack would On Saturday, August 26, a trial of armor took place be the well of the country boarding house, or of the This water collected in subterranean cisterns would The specimen plate that represented the group, which seem to have every title to the highest grade of purity, includes armor for the battleships and the conning especially if the first rainfall is discarded by a special by-pass. Yet cistern water often acquires a very un-

The treatment of such cases would seem to be simple, oak backing with 13 three-inch bolts. The backing and a formula for each case based on an examination at the medial line of the plate was 47 inches thick. of the water might easily be deduced. An agent, such The plate was nickel steel, acid treated, possessing a as the hypochlorites, added in predetermined quantensile strength of about 98,000 and an elongation of tity might be found applicable. Potassium permanganate or binoxide of hydrogen would also seem available reagents and of undoubted efficiency. The highly colored permanganate salt would be of special advantage, as it might be added to the limit of discoloration, thus in itself supplying its formula of application. We have before this had occasion to describe direct aeration applied to the purification of water; the simple bubbling of air through water is found to remove odor and taste. It is possible that many cases conditions of which were that the projectile must not of local trouble with water might be treated by a proper air pump for the injection of atmospheric air

through water in the cistern or well.

The chemist's permanganate test for organic matter in water consists in the addition of an acidulated solution of permanganate of potash of known strength in measured volume to the water to be tested. Organic matter in the water destroys the salt. Its solution is of a very strong violet color, the merest trace of it imparting a rose tinge to water. In the test, after shell when it landed over the boards, where it knocked addition to the water, the rose-colored mixture is alover a stand of blind projectiles, then returning, came, lowed to stand for a definite period. If decolorization to rest under the gun, with its nose pointing toward takes place, more is added until the water retains a the plate. It was apparently undeformed, but decid- faint red color, when it is assumed that the decolorizedly cracked, and its point was highly polished and ing power of the water is exhausted. By calculation smeared with melted copper from the rotating band. the quantity of oxygen absorbed from the permanga-On cooling, the shell began to flake off around the nate is determined and is reported as oxygen required to destroy organic matter in the water in question. The application of such a process to a cistern or well would seem quite possible under proper management, such as might be formulated by a competent chemical authority. If a colorless salt were used, then of course there would be no direct method of knowing when enough had been added. If, however, a virtually nonpoisonous substance were used, an excess of which would not be disagreeable, then it would be quite possible to devise such a system as we describe to be ap-

plied by any person. The rendering sea water potable by the addition below the first point of impact, on the medial line of thereto of silver citrate, thus substituting sodium cithe plate, penetrated the plate, 47 inches oak backing trate for sodium chloride, has been suggested for use in and 10 inches of additional wood, where it remained. cases of shipwreck, and the exact formula for its application has been published. As sea water is virtually of constant composition, a formula was of easy pre-While the plate failed to win a premium for the paration. For organic matter in water, something contractors, the test was eminently satisfactory to the which constantly varies in amount, no universal forgovernment inspectors. The trial was conducted by mula can be produced, and the best that can be done Lieutenant Newton E. Mason, U. S. Navy, in charge might be the use of some agent which even in excess of the proving ground, in the presence of Captain would not affect the water injuriously, while destroy-

John Rae.

Dr. John Rae died at his home, in London, on July 24, after a prolonged illness. Dr. Rae was born in the Orkney Islands. He studied medicine at the University of Edinburgh, and after graduation there he took his degree as licentiate of the Royal College of Surgeons before he was twenty-three years of age. He served for a time as surgeon on a ship of the Hudson's Bay Company, and in 1845 accepted the command of an expedition to the Arctic Seas to endeavor to complete the survey of about seven hundred miles of the coast forming the shores of a large bay, which Parry had failed to accomplish. This expedition, which proved successful, was the beginning of a series of voyages of discovery that made Dr. Rae famous as an Arctic explorer. He was a fellow of the Royal Society, fellow of the Royal Geographical Society, honorary nondent of the Geo nhigel Society

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