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The Croton Water—Its Action on Lead, &c.

The President of the Croton Water Aqueduct Department (Mr. Dean), has presented his yearly Report, and a very interesting one it is. It states that a small jet of a fountain, discharging only half a pint in every ten seconds, wastes as much water as will supply a family of twenty persons, with twenty-seven gallons of water each, daily. It has been shown that there is an annual waste of one hundred millions of gallons by private fountains alone. Millions of gallons are wasted in flooding our streets and washing our pavements, instead of merely sprinkling them; this is particularly the fault among our most wealthy classes, who water their pavements when they should merely sprinkle and sweep them—they really show a want of good judgment, quite inexcusable for educated people. A synopsis of Prof. Silliman's Report on various waters, is presented, and the salubrity of the Croton water, in New York, clearly demonstrated. Prof. Silliman instituted his examinations on the action of the Croton water on lead, as follows:—he took a pint bottle and placed in it a slip of lead half an inch wide and ten inches long, clean and bright, which had passed through the rolling mill but a short time before; its weight was carefully noted before the experiment, and the bottle was then filled and tightly corked, so as to try the effects of the water upon the lead, under the same conditions as upon lead water-pipes.

The only condition of lead in water-pipes, running full bore, which was not met in this arrangement, was in the fact, that as leaden pipes are soldered together, and to the pumps, or brass cocks, and as the solder and brass fixtures are more highly electro-negative than lead, chemical action is more likely to take place on it than if not thus situated. It would, therefore, have been well had there been an independent series of comparative experiments instituted to determine this point, (by imitating the exact condition of the lead), but the time allowed to the research was too limited to allow of a repetition for this purpose.

A bottle of pure distilled water was, at the same time, placed aside with lead, under the same conditions, for the sake of comparison. After five weeks the bottle was opened and examined, when the lead was found as bright and fresh as on the day it was put in, and the water was quite clear. The weight of the lead was precisely the same as when put in, thus showing that no chemical action had taken place.

During the past summer the Department had occasion to take up from the street a lead service pipe, which had been in use 8 years; it was sawed in pieces, very carefully examined (without chemical tests), and no change by oxidation or other action could be detected.

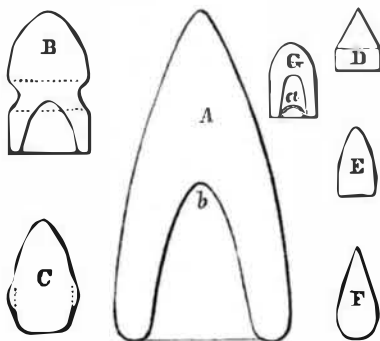
In respect to the cautionary measures to be observed by people having lead pipes in their dwellings, the Report says:—

"The Department is aware of but a single case in which any precautions can be necessary in the use of Croton water for drinking, and these only at elevations, where the supply is not constant. In the upper stories of buildings, where the pipes are alternately wet and dry, caused by the daily variations of head in the Distributing Reservoir, it is possible that the interior of the pipes, by the united action of air and water, may be so oxidized, as that particles of the carbonate of lead might be carried off, held in suspension by the water, and received in the stomach by drinking it; it would be imprudent, therefore, habitually to drink water from taps so circumstanced."

The information presented respecting the action of the Croton water upon lead, is to allay any anxiety respecting the employment of lead pipes. Dr. Chilton's opinion, we believe, differs from that of Prof. Silliman, and even in the analysis of Prof. Silliman it was found that the Croton water contained far more carbonic acid gas than the Philadelphia or Boston waters, and Dr. Thompson considers the carbonate of lead to be the only compound of lead which has poisonous properties. Neither

Christison nor Taylor, however, agree with him. We should like to have more extended experiments on the subject, for it has been found, by the two chemists last referred to, that if water does not contain the requisite amount of sulphates and muriates, it is not considered safe to use, if allowed to come in constant contact with lead. The Croton water, we believe, is safe, good for domestic use, and not liable to corrode lead. We have used it for a great number of years, and never have, to our knowledge, suffered a pain by it, nor have we known any other person who was ever injured by its use.

Rifle Shooting, Bullets, &c.



A Mr. C. A. Holdstock, in a letter to the London Mechanic's Magazine, describes various kinds of rifle bullets and advocates making them with a hollow chamber at their butt end. A letter recently published by an officer in the English army, describes the terrific fire of the French rifle. We propose to present all that has lately been brought forward as now on the subject of the bullet, but first of all let us give a few extracts from the letter referred to on French rifle shooting.

"I find that Mr. Delvigne, the inventor of the now celebrated rifle of the Tirailleurs de Vincennes, had to contend against the ignorance and prejudices of all the civil and military authorities of France from 1836 to 1837, although he pointed out how the best troops of France, under the most experienced officers, had been beaten by the rifle of the peasantry of the Tyrol. The loss, however, of officers and men in Algeria was so great that in 1838 the Duke of Orleans, before going to Africa, organized a battalion of Tirailleurs de Vincennes (then called Chasseurs d'Afrique) to take with him. As an instance of the perfection of this weapon, even in 1838, it may be mentioned that the Duke, while reconnoitring, was annoyed at the pranks played by an Arab Sheik at a distance of about 650 yards. He offered five francs to any soldier who would knock the Arab down. A soldier (M. P.) stepped out of the ranks of the Chasseurs d'Afrique and instantly shot this Arab chief through the heart.

There are now in the French army a force of 14,000 men armed with this "1846 model rifle"—this unerring and murderous weapon, with its cylindro-conique hollow ball.

Capt. Minie, the inventor of the hollow conical bullet, will undertake to hit a man three times out of five at 1,400 yards distance. The French recruits, beginning at 200 yards from the target, and increasing by one hundred yards finish at 1,150 yards. It is found by calculation that at 328 yards a man has the appearance of one-third his height, at 437 yards one-fourth, at 546 one-fifth. By a very simple instrument of the size of a penknife, called a stadia, distances can be measured accurately to 500 yards, and the sights of the rifle can be adjusted to the space indicated by the stadia. I have tried this stadia and measured the distances indicated, and pacing the ground found it correct.

The barrel of the rifle is about 2 feet 10 inches long. The breech is smooth with a small piece of steel of cylindrical form screwed into its centre, and on the proper adjustment of this piece of steel (tige) depends the precision of the firing. When the bayonet is fixed the length is about 6 feet, and its weight about 10 lbs. This sabre bayonet is admirably adapted for attack and defence, and can also be used as a bill hook. The interior of the barrel has four spiral grooves, deeper at the breech than at the mouth. The old French ball weighs 26 grammes, this ball 47½ grammes, (a gramme is 15.43 grains). The ball is of lead, of cylindro-conique shape, but

hollow towards the thicker end, into which hollow is put a piece of iron (culot) slightly fixed in the ball, and resting on the powder. When fired this piece of circular iron (culot) is forced into the interior of the leaden ball, and consequently presses its parts outwards against the sides of the barrel, and produces a more certain aim than if the ball had been forced down with a heavy ramrod and mallet. This rifle can be loaded with the same quickness as the common musket."

This writer praises the French riflemen beyond measure, and says the British are very far behind them. He recommends that the troops sent to fight the Caffers be armed with them. Since his letter was published, we see that the British Twelfth Lancers are to be armed with doubled-barrelled rifles, and that a number of officers and privates have been practising with the new arms, and are to proceed to the Cape of Good Hope to teach the regiment there the use of the same.

The balls used in the doubled-barrelled rifle carbines are of the conical description found so effectual at long ranges, doing great execution at 600 or 800, and in many instances at 1,000 yards' range.

Mr. Holdstock, spoken of, in 1843, after a train of experiments extending through the ten preceding years, says:—"I suggested that the rear of a projectile should contain a parabolic chamber, because all rays parallel to a parabola, after impinging on the curve are discharged into the focus. This principle is applied to the patent chamber in guns, and shortly after the publication of the paper, the French adopted the suggestions in it, and added a little fancy of their own in an iron capsule to expand the lead." This is mentioned in the extract we presented above. In the annexed figure, A is a conical bullet with a butt chamber, b, and is proposed by Mr. Holdstock for cannon shot. It is expected that great changes are about to take place in the British army in respect to artillery and small fire arms.

It is contemplated to have rifled cannon made ready for experiments during the present year, some beautiful self-acting machinery having been invented for grooving the cannon in the most perfect manner. It is expected that with rifled cannon and conical-shaped shot, the field artillery will attain a great range.

The breeches of cannons for this shot must be made stronger than the common kind, but it will require a long train of experiments before artillery can approach to a practical solution of the precise form, to a certainty, of a projectile. It is time, however, that our army was up and doing on this question. The figure B is the heavy Prussian rifle bullet used in the late Holstein war. The deep circular groove of dotted lines was packed with an oiled stuffing to fit the rifle like the piston of a steam cylinder. The centre of gravity is in front of the parabolic chamber in this bullet, which is a self-evident bad arrangement, but which could not be made better on account of the packed groove. The figure C is also a Prussian bullet, with outside packing. The figure D is a cylinder bullet surmounted by a cone, which, although it would fly very true, has a resisting angle to the passage of a bullet through the air, and to be of a proper form it must have a *curvature continua*—like a ship's lines. The figure G is the French bullet spoken of in the extracts quoted. a is the iron capsule in the chamber. It is fired from a four-grooved rifle. The capsule, a, is driven down the chamber of the bullet by the explosion, which thus expands the bullet and makes it fit the barrel perfectly tight. This iron capsule, however, sometimes passes through the bullet, which makes it go wide of the mark, therefore it is not worthy of the praises it has received in the letter quoted. Mr. Holdstock proposes to fill the chamber with gun cotton, and cover it with thin paper, or to fill it with rocket mixture. The Prussians set up their targets at 800 yards; the English rifle is good at 1,200 yards. The question of the best curve for the bullet is one of importance, and about which there are different opinions. It appears to us that a bullet made on the principle of Schiele's anti-friction curve, (see pages 289, 292 Vol. 5, Sci. Am.,)

would be the best, as every part of it is tangential to the circle of the barrel.

Europeans are not acquainted with what has been done in America—the greatest country for rifle shooting in the world. The best work on the subject is that of "the American Rifle," by our friend Mr. John R. Chapman, of Oneida Lake, N. Y. The figure E is the conical bullet of a beautiful curve described by him, and F is the old American picket bullet. It is our opinion that the bullet, E, is the best, and if it had a very small parabolic chamber at the butt, and this left empty, covered with a thin patch, a decided improvement would be the result. The small chamber would leave room for a greater expansive powder effect upon the bullet in the barrel. In Mr. Chapman's work, there are samples of American target shooting at 220 yards, the target being 20 inches diameter. In one sample, 10 shots can be covered with a man's hat around the bull's eye. Our crack rifle shooters employ telescopes on their rifles. Edwin Wesson, who is now mouldering in the dust, used to make fine rifles. We understand that since his death, the factory at Hartford, Conn., has broken down. Mr. James, of Utica, N. Y., makes splendid rifles, and there are a number of excellent rifle makers among us. We would call attention to Mr. Chapman's work. He says that a first rate American rifle, with a telescope, will, in still time, throw all its shots, at 220 yards distance, into a circle of 1½ inches diameter, and at 440 yards into a circle of 8 inches diameter. No European shooting, we believe, can compare with this. He advises the arming of select riflemen with telescopic rifles; a thousand of them would destroy an invading army of 30,000 men armed with muskets before they could advance very far into the interior.

Reward for Inventions.

Letters are pouring in upon us from all directions, since the appearance of F. M. Ray's Card in No. 19, submitting sketches and asking our advice as to whether such and such plans are useful, or likely to receive the reward. Now, notwithstanding our willingness to afford advice to our correspondents upon matters relating to invention, we are compelled, respectfully, to decline attending to any communications upon this subject. We would gladly do so could we afford the time, but our legitimate duties are urgently demanding our attention, hence the reasonableness of our refusal.

The Pennsylvania Railroad.

The Managers, Directors, &c., of this railroad are in a sad state of ill feeling towards one another. We regret to see it, there must be something wrong. We hope the whole truth of double-dealing will be dug out, and those who deserve the blame be held up to public rebuke.

On Tuesday last week there was an election for officers, and no less than 52,000 shares were voted upon. There was a tremendous excitement in Philadelphia. J. E. Thomson, the well known Civil Engineer, was elected President. He has succeeded Col. Patterson. The Superintendent, Mr. Haupt, has been at loggerheads with the late President, and Mr. S. V. Merrick. The stockholders, it seems, have sustained Mr. Haupt. We hope the road will now go on and prosper.

Skins of Raisins.

We see it stated in some papers, that Dr. Devees, of Boston, has said that raisin skins are indigestible, and that nothing but the stomach of an ostrich can master them. He mentions the deaths of three children, caused by skins of raisins not digesting in their stomachs. Well, Dr. Devees, what about their digestibility when cooked? Raisins are fruit, which from time immemorial, have been used as a nourishing and healthy food by all Orientals.

Our Steamships.

It is believed that the petition of E. K. Collins, for a further increase of government support to his splendid line of steamships, will meet with a most favorable consideration in Congress, and that the whole amount of relief requested will be granted.

That veteran clergyman, Rev. Dr. Nott, saw his 98th birth-day on the 23rd ult.