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THE NEW LYMAN-HASKELL CANNON.

The Lyman-Haskell accelerating or multicharge cannon is made with a succession of cylindrical chambers called "pockets" below the bore whose axes point toward the muzzle of the gun and form with its axes angles of about 60 degrees. In these pockets are placed the accelerating charges of powder that ignite after the passage of the projectile, which is started by the explosion of the initial charge in the gun chamber, in the usual manner.

Col. J. H. Haskell, of New York, adopting the accelerating principle first introduced by A. S. Lyman, also of New York, the inventor of the "Lyman accelerating gun," has made a number of improvements on it which are now the property of these two gentlemen jointly with their assigns.

The new Lyman-Haskell gun is expected to throw a projectile four calibers in length a distance of ten or twelve miles, leaving the gun at a velocity of 4,000 feet per second, which, it is claimed, can be done without the danger of bursting the piece, which would occur if the necessary force were generated by the explosion of a single charge.

A number of tests of the principle have been made; notable among them are those at the Washington Navy Yard, where a 2½ inch accelerating gun was tested in competition with a 5 inch Whitworth (English) gun. The target consisted of 5 inches of iron plates backed with 18 inches of oak timber. At a distance of 200 yards, the projectile from the accelerating gun went entirely through this target and landed 100 yards beyond it, while the English projectile fired from the same distance, with double the charge of powder, failed to penetrate the same target. Gen. John Newton, U. S. Engineers, finds that a 10 inch accelerating gun will be as efficient as the 81 ton Armstrong, while a 12 inch accelerating gun will be more powerful than the 100 ton Armstrong.

On the 24th of October a casting was made at the "Scott Foundry" of the Reading Iron Company, for a 6 inch Lyman-Haskell gun. This casting is made without cores, and is to be bored for the pockets and will form the breech section of the gun. Its weight is upward of 50,000. It was cast from two reverberating furnaces charged with 56,000 pounds of cold-blast charcoal pig-iron of the following brands:

Brands.	No. 1 Furnace.	No. 2 Furnace.
Maiden Creek	3,680 pounds.	2,745 pounds.
Juniata	3,670 "	2,745 "
No. 2 Richmond	15,425 "	11,555 "
Falling Spring and No. 1 Franklin	4,775 "	3,575 "
Remelted iron	4,545 "	3,400 "

The section to form the muzzle portion will be cast separately, and firmly joined by socket to the breech section. The whole is to be then lined with steel in one continuous cylinder for the bore and smaller ones for the pockets.

The weight of the gun when completed will be 25 tons, with a total length of 24 feet 11½ inches. It will have a bore of 6 inches, and will carry a ball weighing 150 pounds, of 4 calibers length. Eighteen pounds of hexagonal powder will be used in the breech, with 28 pounds of powder of finer quality in each of the four pockets, making a total of 130 pounds. This is one hundred pounds more of powder than is ordinarily used, and by means of this system of explosion, the projectile will have a penetrating power as 1½ is to 4, compared with other cannon. The initial velocity of the ball will be 4,000 feet in a second, while that of other guns is from 1,500 to 2,000. The ball is calculated to penetrate two feet of wrought iron at a distance of 200 yards. By means of the successive discharges of powder from the four pockets the pressure upon the ball will be maintained, thus giving it its great velocity, which will carry a ball twelve miles. The explosion takes place in tough steel, supported by the strongest cast iron. After its completion, which will be in several months, the gun will be taken to Sandy Hook, where it will be thoroughly tested in the presence of army officers and distinguished scientists.

Conventionality in Designing.

An instructive commentary on our recent criticism of the conventional work of the art schools, as contrasted with the genuinely artistic work of our tool makers and machinists, is furnished by the recent competition in wall paper designs instigated by Messrs. Fuller & Warren.

Speaking of the disappointment occasioned by the designs sent from France the critic of a morning paper says:

"Without being able to lay our hands at once upon the original sources of these designs—without even wishing to say that they are copies—we yet know that there is nothing in them that is not familiar; they are mere variations, and not at all clever ones, on the fashionable stock-in-trade of the day. Some of them are suggestive of the tapestries of French manufacture. One of them has a "filling" that is inspired by Persia; there are two very good borders, skillful treatment of old models, but of the most of them Japan is the fruitful mother—Japan treated rather cavalierly, after the French fashion. But whatever it may be—tapestry, Persia, or Japan—it is all copying, skillful, accomplished, and thorough workmanship, but all inspired by books and all drawn from the brains of other men."

In a later paper, speaking of the absence of originality displayed in nearly if not quite all of the designs submitted, the critic is constrained to say that "it is beginning to be felt that the production of good designs by any of the now long-tried methods of art schools, schools of design, South Kensington schools, and the like, is less and less to be depended on There has been for some time in England much groaning and complaint over the failure of the costly governmental methods employed to stimulate the faculty of design in the British subject, and whether the peoples of the continent are as well alive to their own failure or not, it is nevertheless true, that not only the Germans, the Austrians, and the Italians, but even the French, are reduced to the imitation of the work of the past in every department of manufacture calling for design. It is true they have carried this imitation, not only in the design, but in the manufacture itself, to the very highest point of perfection, so that the brocades and stuffs of all kinds, the metal works, the ceramics, the tapestries, carving in wood and stone, the glass, etc., that are produced to-day are, in all cases where price is of no importance, as well made as they ever were at any time, and even when a cheaper market is looked for these things are often of a very high degree of excellence. But original design has by no means kept pace with manufacture, and though there are a few striking exceptions to the statement, it may be safely said that in design to day we are dependent on the work of those who have gone before. The design of to-day consists in clever copying or clever combining of what has been produced by other people in other times."

Medals for Electric Lights.

The jury of the International Electric Exhibition has awarded gold medals of the highest class to Edison and Brush for dynamo magnetic machines, and a gold medal to Maxim. Also, gold medals to Edison, Brush, and Maxim for arc incandescent lights. Edison takes five gold medals in all, being more than any other exhibitor.

Copper in Subnitrate of Bismuth.

It is well known that commercial bismuth often contains copper, and that even when the percentage of copper is too small to color the nitric acid solution, the blue becomes very perceptible upon the addition of ammonia for the purpose of precipitating the subnitrate. At first thought we are inclined to think that the ammoniacal compounds of copper, being very soluble in excess of that alkali, would be easily removed by washing, but experience proves that this is not the case, as no ordinary care, nor even extraordinary perseverance, can remove the blue tint. The following method is, therefore, recommended in cases where it is required to remove copper from bismuth.

The bismuth is first dissolved in cold concentrated nitric acid, preferably an insufficient quantity. On the following day a mass of perfectly white transparent crystals are obtained, from which the bluish mother liquor is to be drained, and the crystals washed with a little strong acid. In a day or two a second crop of crystals are obtained, and are also drained and washed in the same way. If by this time the mother liquor has become dirty or full of black specks, it is filtered through gun cotton. It may be necessary to concentrate it somewhat toward the end to obtain the last crop of crystals. Nitrate of copper, being exceedingly soluble, remains in solution to the last. When no more crystals are obtainable the little bismuth still in solution may be precipitated by ammonia, washed, dried, and worked over again. The different crops of crystallized nitrate of bismuth are triturated with a little water and poured into water, or ammoniacal water, as preferred. In case it is merely precipitated by water, about one-fourth remains in solution, and can be recovered from the filtrate by means of an alkaline carbonate in the form of subcarbonate of bismuth, a preparation of equal value to the subnitrate. Where purification by crystallization has not preceded the precipitation of the subnitrate, the second product, namely, subcarbonate from the filtrate, is frequently of a dark color, since all the foreign metals present in the whole of the original material are here concentrated into one precipitate.

Melbourne Awards.

Messrs. Joseph Burnett & Co., of Boston, received at Melbourne the first order of merit for flavoring extracts and the second order for colognes and chemical products, instead of the second and third orders respectively, as was stated in the report of American awards at that Exhibition printed in the SCIENTIFIC AMERICAN SUPPLEMENT of July 2.

Electric Light in Rail Cars.

Recently the Brighton (Eng.) Railway Company introduced the electric light on a special train of Pullman cars. Thirty-two Faure secondary batteries were employed to the car, to operate a dozen Swan lamps. The illumination was said to have been satisfactory.

A Compressed Air Motor for Elevated Railways.

A very promising trial was lately made of a compressed air motor on the Second Avenue Elevated Road. The air was stored in four tanks, under a pressure of 580 pounds. After running from 127th street to 42d street and back, making the usual stops, the pressure was reduced to 125 pounds. The inventor claims that with proper facilities at each end of the road the motor can be charged in from two to three minutes time.

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