EDITORIAL CORRESPONDENCE.

The "Prater of Vienna"—Condition of Austria—Its Mineral Wealth—Linz and its Fortifications—Scenery on the Danube—Salzburg and the Salt Mines—A Novel Visit—A Splendid Lake.

SALZBURG, Aug. 3, 1867.

Some of our Country's people, traveling in Europe, seem to be blessed with a sort of microscopic vision which enables them oftimes to behold wonders in European travel that others less highly favored, never see. The class of which I am speaking esteem it a privilege to annoy a fellow traveler by a very elaborate description of places or things which by chance he failed to see. Wishing to travel as comfortably as possible with such of my countrymen as I might fall in with, I have made it my business to see about all that is ordinarily considered worth seeing, and my experience is, that many of these wondrous objects dwindle when actually looked upon. I had sometimes heard it said that the "Prater," or great park of Vienna, was finer than the Central Park of New York, and therefore I was prepared in advance to see something very grand. The "Prater" is a large piece of land just outside the city, extending some four miles to the banks of the Danube. At the entrance there is a circular place or hub from which radiate five or six avenues, like the spokes of a wheel. One of these avenues, used as a fashionable drive, is a broad, splendid roadway, covered by umbrageous trees, and as straight as an arrow. At the end of it is a shooting box of the Emperor, around which carriages drive back again to the grand avenue. The park itself has the appearance of a very large field, destitute of engineering and ornaments, unless immense beer gardens, coffee houses, and sausage-cooking shops come under this head.

Everybody goes to the "Prater," of course, but chiefly to sip beer and coffee, eat Würste or sausages, and to listen to tolerably good bands of music that are employed to draw and entertain customers; and although I visited the "Prater" at the fashionable hour, I did not see the splendid equipages, coats of arms, fine liveries, belted Bohemian Jagers, Hungarian lacqueys, and all those things which I supposed to be common to this spot. With the exception of grand old trees, which time alone can perfect, the Central Park, of New York, is the finest in the world.

They have rather of an odd way of sprinkling the streets of Vienna. An immense hogshead is mounted upon four wheels, filled with water, and drawn by a pair of horses. To the rear end of the hogshead there is attached a leather hose provided with a common rose sprinkler. As the cart moves slowly along, a man, walking behind, shakes the sprinkler to the right and left by means of a cord attached to it. However, two men find employment at a job which, in any enterprising country, would only require one to perform it much better. In castles, palaces, fine monuments, and public buildings, vast collections of pictures, and such other things as interest the mere curiosity of travelers, and a gaping, listless multitude, Vienna is a splendid city; but so far as regards the practical arts and sciences, it is everywhere apparent that the Austrians are behind the age.

The Emperor is one of the Hapsburg House who date the commencement of their monarchial rule back six centuries to a Swiss—Rudolph Von Hapsburg. Governed by a sort of blinded religious zeal, they have never been able to win over to their system of government any one of the numerous nationalities that form a part of the Empire. The Government is understood to throw obstacles in the way of inventions, and seems never disposed to foster and encourage those elements which alone can elevate a nation and its people to true greatness. The misfortunes of last year have begun to open the eyes of the people to a realization of the fact that no nation can be truly prosperous when more than one-half of its able bodied inhabitants are soldiers, civil employes, or members of some monastic order, who have for centuries been eating into the vitals of the State, and bringing it nearly into bankruptcy and ruin. Some sovereigns seem to act as if nations were made expressly for them to govern, and the subjects a species of live stock to be transferred from one to the other as so much property.

Austria is really a fine country, and possesses capabilities of becoming one of the most prosperous. The Danube, perhaps the finest river in Europe, drains its rich valleys, and its branches extend far up to the Tyrolean Alps, which are stored with iron, lead, quicksilver, and other valuable minerals, besides an abundance of coal and salt. Nature has lavished her most bountiful treasures upon the the dominions of Austria. Its people are kind hearted, hospitable, and patient, and all they seem to need is a government to assist them in the development of their resources, which seem to lie wasting for lack of enterprise.

Leaving Vienna, we followed the windings of the Danube up to the old city of Linz, which is said to be celebrated for the beauty of its women, the fine views in its vicinity, and for its new fortifications. We saw the views, which were certainly very fine; we also visited the fortifications, and looked sharp to see the beautiful women, but saw none, and were forced to the conclusion that some guide-book publishers had been paid to introduce this feature as one of the attractions of Linz, hoping thereby to induce bachelors, at least to stop and look after them.

The fortifications of Linz differ from any others I have yet seen. They were designed by the Archduke Maximilian, and constructed at his expense. Instead of a continuous wall, with bastions at intervals, there are a series of isolated stone forts, that look like the stone barns of the Shakers—some thirty or more—which encircle the town and are connected by a covered way, forming a circuit of about nine miles, the highest eminence, called Postlingberg, being surmounted by five towers which form a citadel. These towers are all constructed with great engineering skill and are capable of holding a garrison of two hundred men. They are three stories high, the lower stories being used for storage, and powder magazines. A deep ditch surrounds every tower, so that only the upper story, or gun deck is exposed. In case of an assault, however, guns could be employed in each story, and so trained as to cover every approach. It yet remains to be seen how far this system of sunken towers is an improvement upon the ordinary method of fortifying towns, but it appears to me to combine great excellencies for the defence of these important inland towns, which are always liable to attack, whenever the balance of power requires to be readjusted—and owing to faulty construction, this balance seems always to require some tinkering.

From Linz the scenery of the Danube, many miles upward, is exceeding grand and impressive—quite equal to the Rhine, but tourists run after each other, and few, comparatively, ever think it worth while to get off the railway to make a trip on the Danube.

We spent three of our most delightful days at the old city of Salzburg, which is reputed to be the most beautiful spot in Germany. It would be difficult to find, in any mountainous district, a place that offers so many attractions to one who loves romantic drives through mountain passes and splendid scenery. The city itself is very curious, having old gateways, very narrow streets, dark passages, and old castles, one of which, founded upwards of eight hundred years ago, stands upon the summit of a rock that seems to spring from the ground, rising almost perpendicularly 420 feet above the river which rushes through the town with a tremendous velocity. During the turbulent period of the middle ages, this old rock-bound castle furnished a safe retreat for the tyranical Archbishop who governed the country with a rod of iron. It makes one shudder to think of the awful transactions which have occurred in this castle. In one of its towers is shown the chamber of torture with the rack by which the victim was raised, and a stone weight of 150 lbs. attached to the feet; and the trap door in the floor leading to an awful dungeon below, through which the victim was hurled, and there cut to pieces. A secret under-ground stairway leads from a chamber of the palace down to the old cathedral in the city, and through which, in the sacred name of religion, Christian believers were carried to this chamber of terrible suffering and death.

The Tyrolean Alps stand immediately above Salzburg, one peak rising above the other, until they enter the region of eternal snows. It was a curious sight to me, for the first time, to look upon such a scene—the valleys below rich in the verdure of summer, while above, a few thousand feet, and nearer to the sun, the snows never melt away.

About ten miles above Salzburg, in a deep gorge of the mountains of Bavaria, are the famous salt mines, which have been worked upwards of two hundred years. Wishing to see these mines, a party was made up, and, after a carriage ride of nearly two hours up the valley of the Salza, which winds around between high mountain peaks, we reached the mines, and, without difficulty, obtained permission to enter. Ladies as well as gentlemen are permitted to enter the mines; but before doing so they must put on the breeches. The dress provided consists of trowsers, a coarse blouse, a brigand hat, and a leather apron, strapped about the waist to cover the seat. Ladies thus rigged looked comical in the extreme; but such is their praiseworthy curiosity, they cheerfully submit to the grotesque costume, and with lantern in hand, they join in the procession, and behind a trusty guide enter the main adit, which has the appearance of a receiving tomb. After traversing the adit for nearly half a mile, straight into the mountain, we ascended a flight of 450 stone steps, which brought us to a salt-water lake, forty feet deep, all beautifully lighted up. We were ferried across this gloomy Styx in a small boat, and then again entered the adit, and after a short walk we reached the pithole, where we discovered the value of our leather aprons. To enter this pit it was necessary to slide down upon two smooth bars, which resembled a ladder without rounds when placed up the sides of a building. With lantern in one hand and a leather gauntlet upon the other, to clasp a rope, the guide slides upon the bars, and the party follow his example; and thus, holding tightly upon the rope and riding pick-a-back, we went down two or three fearful descents until we reached the great salt cavern where the miners were at work. The ascent of the 450 steps, and the descent made upon the leather aprons, brought us again to one of the branch adits, on a level with the main adit, where the party were requested, without respect to sex, to get astride a car, upon which, by our own momentum, we made a a rapid railway ride to the place of entrance, the whole tour occupying an hour. Within the mine there is an artificially prepared grotto or chapel, which, when lighted up, shows a most beautiful effect upon the salt crystals, which are arranged in fanciful forms. A stream of fresh water has been introduced into the mines, and the brine is carried in wooden pipes, long distances, where fuel can be obtained abundantly for its evaporation. These conduits are carried along the sides of precipices, through tunnels, or canals, cut in rocks, and over deep ravines, supported upon piles or props, in one instance, as I was informed, a distance of thirty miles. A short way above the mines is a lake called the Kings' Sea, which is most awfully grand. It lies between snow-capped mountains, which rise so precipitously above it that it is scarcely possible to gain a foothold. We were rowed through the lake in a small boat, three men and three women pulling at the oars; a pistol discharged from the boat reechos like a sharp peal of thunder. I have never before looked upon such scenery, but I am going on to Switzerland, where, I suppose, things are done on a grander scale.

S. H. W.

Special Correspondence of the Scientific American.

VARIOUS NOVELTIES IN THE EXPOSITION.

PARIS, August 6, 1867.

The second trial of mowers and reapers, which I mentioned in my account of the first was to be held, has after several postponements, at last taken place. The ground mowed was exactly the same as that appropriated two months ago, the grass having in the mean time grown to a sufficient hight, but a less area was apportioned to each machine. Nearly or quite as many machines took part in the competition as on the previous occasion, and the results were equally favorable for American inventions. The area to be mowed by each machine was one acre. Wood's machine was again first in completing its work, but escaped only by an accident being robbed of its laurels by the Perry mower. The latter had cut all its plot except about thirty seconds work in its last swarth when by some means or other it broke its cutter bar, causing a delay of ten minutes to replace it. Notwithstanding this accident it came in second only, the actual working time being but about twenty-six minutes, and the quality of work done first rate. This machine has received some modifications since the last trial, but perhaps owes some portion of its success to the skillful manner in which it was handled. Wood occupied thirty-three minutes in cutting his field, thus very well sustaining his previous position. McCormick's machine also did well, but Howard's was less fortunate than before, meeting with some serious mishaps and doing its work badly. On the whole, therefore, the relative standing of the best machines was not much changed by this trial, except in the increased efficiency of the Perry mower.

A characteristic American invention is that of separate teeth for circular saws, several forms of which are exhibited, made under Emerson's and Miller's patents. It would be difficult to conceive of an innovation of that class originating in England, though having once seen it they will be quick to appreciate its value. There appears to be no one to give any information in reference to these saws, though there are many who would be glad to hear about their practical operation.

The electric light on the top of the ugly frame work in the English portion of the grounds is now working well, giving a magnificent light. The electricity is derived from a pair of magneto-electric machines running at 400 revolutions per minute, and the apparatus is in motion for several hours during the day, and from 9 to 10 o'clock in the evening, competing at that time with the French oil light. One should properly be several miles away to judge correctly of their relative powers.

Some very fine Fresnel lenses are exhibited by Messrs. Chance, of Birmingham, makers to the Trinity board. They have received a prize medal, and astonished the public a short time since, in proving them, in a photometric trial, nearly ten per cent superior to the French lenses, which have long held the first rank. Their efficiency is attributed to excellence of workmanship, as the quality of the glass does not appear equal to the French, and is said not to be so good as that usually turned out by this firm, owing to some difficulties with their furnaces at the time this was made.

One of the most interesting portions of the Exposition is that of railway carriages, particularly in the French department. We have been accustomed to think our system of long cars with four-wheel swiveling bogies at each end, the best possible for ease of working and economy of repairs to the permanent way. But whatever it may have been in time past, I think it is evident that our railway companies are beginning to find that there has been a growth in the wrong direction, and while builders and patentees have labored to produce the most luxurious accommodation for the public—and let us give them all praise for having done so—they have lost sight of the requirements of the railway in increasing the weight beyond measure, so that our heavy sleeping cars have become almost as destructive of permanent way as locomotives. To reduce the weight per axle, they have in some cases resorted to the use of sixteen wheels, but as these bogies are themselves the heaviest part of the structure, this shift involves a considerable addition to the total weight. A study of the European carriages exhibited, gives reason to believe that after all the system in vogue here, of short vehicles resting on two single axles with no heavy truck frames, but simply a light wrought-iron jaw to receive the axle box, is the true one. Counting up the number of passengers which these carriages will contain and taking the weight of the structure, we find that the dead weight per person is decidedly less than with us. A new feature which has been introduced within the past year or two on some of the railways of France, viz., the addition of a second story to the carriages, for second and third class passengers, has still further reduced the proportion existing between dead and paying weight, and really makes our figures seem quite extravagant. The use of iron framing is another of the means by which the weight is reduced, and despite of all the objections, such as noise, rigidity, etc., that have been raised against the substitution of iron for wood in this case, the use of iron frames is becoming continually more extended and appears perfectly satisfactory. With a view of removing the jarring which has sometimes been complained of with this mode of construction, some of the carriage bodies exhibited are not placed directly on the frame girders, but are supported by cast-iron brackets bolted to the sides of the latter, and having disks of india rubber on their top surface, to act as a cushion and prevent the transmission of vibration from the wheels. This matter of light carriages is one that deserves careful attention from our railway men, for it is evident that the present system is far too expensive both in first cost and in maintenance. The hight of the two-story carriages is not much greater, if any, than that of our "monitor" cars, and as the upper story is not carried quite the full width, the

center of gravity is maintained well within the base. Great numbers of them are now in use here, and it is certain that their adoption will be extended.

While noticing the railway carriages we must not pass over the carriage which is exhibited as one of those intended for the temporary Mont Cenis Railway. As several years must elapse before the completion of the great tunnel which is to establish railway communication between France and Italy, a railway is in course of construction to ascend the mountain itself by a route similar to that now followed by the diligence, working at gradients much steeper than those generally allowed in railways. To render this possible a double-headed rail is laid on its side between the two ordinary ones, and supported so that a set of horizontal wheels on the locomotive can be made to grip this rail and thereby obtain an adhesion independent of the gravity of the engine. The carriage is also provided with two pairs of wheels bearing against this middle rail, but apparently not intended to do much work, as they are not provided with axle boxes. A brake is arranged to seize this rail, beside others applied to the carrying wheels in the usual manner. The seats inside are arranged along each side as in an ordinary omnibus, the gage of the road being considerably less than the standard width, but are comfortably cushioned as in ordinary first-class carriages. The whole is of course arranged with chief regard to lightness, and it is probable that for its purpose the railway will be very successful.

There are quite a variety of devices for establishing communication between the guard of the train and the passengers, exhibited, and some of them are in use on the French railways. They always involve a galvanic battery or some other system of machinery which to Americans seem absolutely elaborate and unnecessary. Europeans think that with their system of close compartments passengers could not be trusted with the simple bell cord as we have it, but they might at least give it a trial, and perhaps they would find their fears groundless, while they would certainly save themselves much expense. But it is contrary to French principles to trust the public, and expense is preferred to such a breach of principle.

SLADE.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Chicago Artesian Wells--A Question in Hydraulics.

MESSRS. EDITORS:—On Saturday, August. 17th, the Mayor, Common Council, and Board of Public Works of Chicago visited the artesian wells, for the purpose of testing the head of water, quantity discharged, etc., in order to ascertain whether it would be practicable to apply the water to city uses. There are two wells, one 5 inches in diameter at the surface, contracted to 4½ inches at the bottom; this well is 711 feet in depth. The other is full 5 inches from the surface to the bottom; in this latter well is inserted a cast-iron pipe 64 feet in length, which penetrates the rock 42 feet and projects above the surface 22 feet. This pipe is 5¾ inches in diameter and is cemented in and fits the well perfectly tight. From the top of this pipe the water is discharged upon and drives an overshot wheel twenty feet in diameter, used as a power for drilling and enlarging the other well.

In order to test the head of the water, the first well was stopped or plugged forty feet down with an ordinary leather sand bag, so that no water came from this well at the time of the test. Now a cap was fitted on the top of the cast-iron pipe, and a common gas or water pipe 1¼ inches in diameter was inserted in this cap, and carried up until a hight of 45 feet above the surface, and 87 feet above the level of the lake was reached. The water overflowed above the top of the pipe 18 inches in the air, when the fact was exhibited and it was readily seen that the water would rise much higher in the opinion of the City Engineer, as much as forty or fifty feet. The plug in the cast-iron pipe at the level of the top of the wheel was removed, and the water discharged at that point. It was estimated to flow here 300 gallons per minute, or 432,000 gallons per day. Then the plug at the surface was removed, and the water discharged there. This was accurately measured, and found to be 345 gallons per minute, or 496,000 per day. The water at both elevations discharges with great force and power, and we estimate its resisting force in either well at from 600 to 800 pounds, though this fact has never been accurately determined. Now we find that upon closing both of the lower orifices, the one at the surface and the other at the wheel, the water rises to and overflows the top of the pipe only three or four inches, and does not reach its full head of eighteen inches until after the lapse of from twelve to fifteen hours, and during this time it seems, as it were, to creep up by degrees, growing stronger and stronger the longer it is left undisturbed. Now the question is, why does not this water rise at once, and as soon as the lower orifices are closed, to its full head or fountain level? The natural supposition is that it would rise and discharge in less than five seconds, but it does not. At the lower orifices there is not, and has not been for nearly three years, any perceptible diminution or variation in the flow of water, but it comes all the time with the same force and power. Seasons, wet or dry, make no difference. There is no change in the temperature and no change in the quantity.

I can illustrate this by referring to the fountain in the City Hall Park, New York. Suppose the head of this fountain is seventy feet; now screw on a two-inch pipe, say fifty in hight. The water would spout out of this pipe perhaps ten feet in the air. Shut the water off and turn it on again. the discharge would be the same, and the time but momentary. Now, while the discharge from our pipe in the air is fully eighteen inches, yet we cannot obtain that amount except by waiting a given length of time. Can you, Mr. Editor, or any of your readers, solve this question for me?

GEO. A. SHUFELDT, JR.

Chicago, Ill.

Long Range Guns. Vacuum before the Shot.

MESSRS. EDITORS.—The closing paragraph in a communication from E. H. Pardee, in your paper of Aug. 3d, requires a notice from me. It is in regard to firing projectiles *in vacuo*, or from a barrel exhausted of air.

This idea originated with me several years ago, and in 1852 I addressed you a private communication on the subject requesting an opinion. Your reply, in "answers to correspondents," in your paper, will show it, even if the original letter be not preserved. The rapid retardation of shot by the atmosphere has been long well understood, but the powerful effect of this resistance on the shot, before it emerges from the barrel, has not been sufficiently well considered. One would hardly suspect, unless he had made the calculation, that, in the thirty-two pounder, the resistance is more than four hundred and fifty pounds. And this is far more difficult to surmount than that offered by the inertia of a solid body of that weight. Because, the latter is susceptible of accelerated velocity, and of increasing force, while the other, being due to elasticity and not to weight, is incapable of absorbing force. Thus in the case of atmospheric resistance, when the charge shall have traversed half the length of the chamber, it is still wholly inert. It has acquired no inherent volocity, no independent force, and offers quite as much opposition to the driving power, at that point, as at the start. Now, when it is considered that this resistance, to some extent, increases, while the propelling power decreases with tremendous rapidity, it will be seen, that a point is very soon reached, where acceleration ceases, and, beyond which, any additional length of barrel tends to diminish the force of projectiles.

It has been estimated that powder, transformed to gas, expands to two thousand times its bulk, and, that this expansion takes place, *in vacuo*, with a velocity of five thousand feet per second. If this be so, then, a charge of powder occupying one linear foot, in an exhausted chamber two thousand feet long, would fill it, less the amount of explosion due to the quantity of heat absorbed by the barrel; and it would fill it in two fifths of a second. It is evident, also, that a shot placed before this charge, would soon acquire its maximum velocity, and plunge into the external air with terrific force, but at what point acceleration would cease, could be determined only by experiment. In a gun of six inches caliber, perhaps fifty feet might be necessary, and, if so much, it would limit the practical application of this principle, for pieces of so great length, could be used only on fortifications or in sieges, and, possibly also, on large steam ships. Such pieces would have to be made in sections, screwed or bolted together; but the sections could be made extremely light without danger, provided the breech section was of usual strength.

To produce the requisite vacuum at the proper moment, would require the aid of steam, applied as in the Gifford Injector. Let the muzzle of the gun be gently tapered almost to an edge, and surrounded by a second muzzle or rim, extending back ten or twelve inches, with a roomy cavity between, but narrowed down at the point, so that a thin cylindrical sheet of steam would jet forward from it around the bore. A pipe running from this cavity along the barrel to a point central between the trunnions, and these connecting with one from the boiler, would admit the steam, which could be turned on the instant before firing. It would at once almost perfectly exhaust the chamber and relieve the shot, as it advanced, of all opposing pressure.

I am not certain about it, but I think that in my communication, above alluded to, I suggested, in connection with this principle, the idea of accelerating charges, located in recesses along the barrel of the gun. This idea was original with me at the time, but has also been suggested by others. I have seen it, either in the SCIENTIFIC AMERICAN, or elsewhere long before the description of Lyman's Accelerator appeared. Nor, have I any doubt, that it was original with that gentleman also, who deserves all the merit of it for having first practically applied it.

But, I had concluded, that this thing of acceleration, could be accomplished in another way, much more simple and quite as effectual, by a re-enforcing cartridge, used in the ordinary guns. I think it practicable to make a cartridge, with partitions, each partition containing a full charge of powder and so divided, that when fired from the front, they will explode in succession, thus affording all the advantages of accelerating charges placed in recesses along the chamber.

This cartridge, fired *in vacuo* with sufficient length of barrel, would bring us at one step, to the utmost limit of improvement in the range of projectiles by giving an initial velocity equal to that with which the gasses of powder rush through a vacuum.

Such a projectile, moving with such velocity, like some headlong body, falling from the empty regions of space, into our dense atmosphere, with the heat evolved by its violent compression, added to the high temperature acquired, in so long a barrel, by contact with the burning gases, might become incandescent and flash through the air, like some gleaming meteor, thundering on its way.

These speculations unsustained by any practical proof, will have to be taken for what they are worth, as mere fancies, until some one, with ampler means than I, shall test their value by a course of well directed experiments.

H. S. WHITFIELD.

Tuscaloosa, Ala.

The Shipment of Crude Petroleum.

MESSRS. EDITORS:—I have read the article in your valuable journal of Aug. 17 issue, in relation to the sad and fatal accident which happened to the ship *Meteor*, on board of which was stowed upward of two thousand barrels of crude petroleum bound for London. The fearful nature of the accident, which in one minute rendered the noble ship a burning wreck, killing by the explosion of the vapors, one half the crew, and destroying thousands of dollars worth of valuable property, calls for more than a passing remark from the journals of the day. I am gratified and personally thankful that you have so ably criticized the practise of shipping, so inflammable an article as crude petroleum at all, and putting it in the poorest class of barrels, often very leaky and imperfect, always selecting the best glued packages for the finished illuminating oil, which latter article is not dangerous to life or property, owing to the volatile naptha being removed by distilation from it. I have had for the last twelve years much experience in the manufacture of coal and petroleum oils, having had the entire charge of the Downer Kerosene Oil Works from their earliest commencement, and oil, either crude or refined, with the naptha honestly removed from it, is as safe as most articles of commerce in the line of oils. All that is necessary is to distill off the naptha, which is easily and cheaply accomplished, and the last of such frightful accidents as the loss of the *Meteor* would be recorded. Naptha, however, is very largely consumed in Europe for many uses in the arts, such as varnish-making, painting, carbureting gas, etc. If it is all removed from the crude oil, it must be shipped either in tin or metalic vessels, at a large cost for packages, or some suitable vessel must be employed that is, and will remain, perfectly tight, allowing no escape of naptha or gas from it to pervade the vessel. Ordinary barrels do not hold the naptha, the leakage being often from ten to twenty per cent. of the entire cargo; but I do claim that the new tongued and grooved and cemented joint barrel, as illustrated in your paper of July 20, 1867, will carry without leakage, to any European port, the most volatile naphtha, as well as either crude or refined petroleum. The company I represent have shipped largely to Europe, and also to tropical climates, oils and whole cargoes of naphthas without a particle of loss, and when the means of transportation of these valuable products of our country, is within the reach of every shipper of oil, it seems to me the careful merchant and refiner will avail themselves of it and by the use of this improved package render the transportation and storage of these products safe and profitable. You are in error when you state there is no use for naphtha either in New York or Europe, and that it is only of value at the wells where it is produced, as several hundred thousands of barrels of naphtha are consumed per year in this country and Europe; our company, alone, make and sell yearly at least $400,000 worth of naptha.

JOSHUA MERRILL.

Boston, Mass.

Acceleration of Shot.

MESSRS. EDITORS.—Having seen an interesting account of Lyman's Accelerating Cannon in your valuable journal, I thought my experiment to increase the velocity of shot for fowling might be interesting. I first constructed a tube to communicate fire to the center of the charge of powder; this sudden expansion bruised the shot in overcoming their inertia. This objection led to a mode of putting the shot in motion before the powder was all burned. I constructed a long narrow chamber in the breach of the gun and communicated fire to the top, or end next the shot. This had the desired effect; the shot were put in motion before any considerable quantity of the powder was burned and were followed up by the powder burning back, increasing their velocity, and I could use double the quantity of powder with ease and safety and with greatly increased effect. If the length and diameter of the chamber were proportioned to the required capacity of a cannon, I think it would be preferable to having the powder in chambers, along the bore of the gun.

SETH BOYDEN.

Newark, N. J.

Screeching of Steam Whistles.

MESSRS. EDITORS.—A steam whistle can be varied in tone by raising or lowering the bell on the standard supporting it, the same being provided with a thread and jam nut for that purpose, but different notes, or discords, are often made by whistles without changing the position of the bells; in other words they screech. This is caused by the vibrations occurring in unequal times so that the waves interfere with one another. The inequality in the vibration is occasioned by suddenly opening the valve so as to start the edges of the bell before the mass has time to respond, by water upon it, and by disproportion in the bell itself. Some whistles are never satisfactory in their operation. These hints may lead to a remedy.

E. P. WATSON.

New York city.

The Willow and the Levees.

MESSRS. EDITORS.—Your correspondent, G. W. R. B., in your issue of Aug. 17, labors under an erroneous impression in regard to the willow. No tree is more tenacious of life in any soil, wet or dry. Of its applicability to strengthening the Mississippi levees there is no reasonable ground for doubt. A line of willow posts or stakes thrust not less than three feet into any soil, will take root and grow vigorously. The only object should be to put them to such a depth that the bottom may be constantly moist. They may be set upright, or take the direction of any embankment with one end below the water line and the other at the top of the