

sticks cut from the woods, and not even divested of bark; the legs of the trestles are braced with round poles. It is in four stories—three of trestles and one of crib work. It carries daily from 10 to 20 heavy railway trains in both directions, and has withstood several severe freshets and storms without injury." This bridge has excited to a high degree the admiration of several European military officers who have visited the scene of military operations in Virginia.

QUESTIONS ON SUBJECTS CONNECTED WITH THE MARINE STEAM ENGINE; by Thomas J. Main, M. A., Professor of Mathematics in the Royal Naval College, Portsmouth; and Thomas Brown, Chief Engineer, R. A., attached to the Royal Naval College. Published by Henry Carey Baird, 406 Walnut street, Philadelphia. Price \$1 50.

This is a republication of a London work, the chief object of which is to afford practical solutions to questions relating to the construction and working of steam engines: especially the marine engine. It constitutes a valuable help to engineers who design to enter the American navy, although intended for those of the British navy. It contains the questions from the examination papers, for engineers before the naval board, with hints for their solution. The following is an example of the questions and answers contained in it:—

"The stroke of an engine is 7 feet 6 inches, and the diameter of the paddle-wheel is usually about eight times the length of the crank; find the diameter of the paddle-wheel.

(1). $7\text{ feet }6\text{ inches} \div 2 = 3.9\text{ inches}$ the length of crank.

(2). $3\text{ feet }9\text{ inches} \times 8 = 30\text{ feet}$ the diameter of paddle-wheel."

PAPER-MAKING IN AMERICA.

In the very interesting communication on the history of paper-making, which was published in our last issue, we stated that the first paper-mill in America was erected on Chester Creek, Pa., by a Mr. Wilcox. This information was derived from the invaluable treatise of Mr. Joel Munsell, of Albany, N. Y., on "The Chronology of Paper and Paper-making." Since then we have learned that Mr. Horatio Jones, of Philadelphia, read a paper on this topic on the 5th instant before the New England Historical-Geological Society, Boston, in which he claimed an older paternity for the manufacture of American paper than is claimed for Mr. Wilcox. He said "the idea had been generally propagated that the first paper-mill in America was established by Thomas Wilcox, on Chester Creek, Delaware county, Pa., in the year 1714. Standard historical writers have so stated it. That mill was, however, the fourth or fifth in America, and was not built till 1729 or 1730. From 1690 until 1710, there was but one paper-mill in all British America—the Rittenhouse paper-mill. It was situated in Germantown, Pa. The first manufacturer of paper in this mill was William Ryttinghuisen, now anglicised into Rittenhouse. He was born in the principality of Broich, in 1644, came to Pennsylvania soon after his arrival in America, and was among the early settlers of Germantown. In 1700 or 1701 the pioneer paper-mill of America was carried away by a freshet. So important did William Penn regard the mill, that he wrote a letter or certificate recommending the citizens of Pennsylvania to aid in rebuilding it. This was done about the year 1702. It has been in possession of, and worked by the descendants of Rittenhouse, as late as 1855. It is now the property of Peter Rittenhouse, who has lately converted it into a cotton factory."

Mr. Jones said that the water-mark so much used by the early paper-makers had enabled him to discover, in an old blank book, some of the paper made in this mill before 1690, on part of which his sketch was written.

A NEW RAILWAY DANGER.—Swarms of locusts have, in many cases, lodged on the Ottoman railway, and compelled the engine-drivers to proceed with great caution. The locusts on being crushed by the engine on the rails, make them excessively greasy and slippery, so that the wheels will scarcely bite. The consequence is some degree of danger, and sand has to be dropped on the rails to give the wheels a hold.



Music by Telegraph.

MESSRS. EDITORS:—The idea of introducing music into families within the limits of a city, by means of electricity, has at times been the *beau ideal* of my inventive speculations for the last several years. That every parlor of a city could be furnished with music, and music too of the highest order, as the most of houses are furnished with gas and water, should not be considered one of the impossibilities of the age. From the attention I have given to the subject, I believe the plan is highly practicable, its merits being—simplicity in mechanical construction, perfection in operation, and affording a novel, but most exquisite pleasure to many private families and social circles, at a trifling expense.

To explain what would constitute the mechanical construction of this happy invention. In some central part of the city locate the musical depot or studio, say of a highly skillful performer on the piano, melodeon, or organ; we will select the piano. To this instrument there is an electrical attachment, which may be made to communicate with a thousand other pianos in the city, these again having their own peculiar magnetical attachments. In this arrangement there would be a half an inch thick electrical conductor or poles, running through different parts of the city, as the means of communication from the operator's piano to those connected therewith throughout the city. Here is a state of affairs where one person may be playing a thousand pianos at the same time! There would be no speculation as to the perfect success of the operation. From what we know of electrical velocity, and its precision of action, there is a certainty, that as the music is performed at the depot chamber, so will it be reproduced precisely at the player less piano in each dwelling with which it may be connected.

In regard to the financial character of this invention, it would not require much of an effort to be made popular; and to make it popular would be to make it profitable. We are of the opinion, it would be a stock operation that would pay, probably better than any other. Those taking an interest in this invention who wish further information on the subject, may address the subscriber.

G. P. HACHENBERG, M.D.

Springfield, Ohio, Aug. 9, 1863.

[The above is certainly a novel use for the electric current. But there is probably no practical difficulty in the way of its successful accomplishment. Things more wonderful are done every day through the agency of electricity. We would, however, advise all our young lady friends to continue the study of music with as much zeal as ever; for there is no more likelihood that this telegraphic music will take the place of ordinary performances, than that telegraph writing or messages will supersede ordinary correspondence.—EDS.]

Molasses from Indian Corn.

MESSRS. EDITORS:—The present high price of sugar should be the means of directing attention to the production of sugar or molasses from Indian corn, which is so abundant and cheap. In repeated trials, I have obtained $5\frac{1}{2}$ gallons of molasses from one bushel of corn, weighing 56 pounds; and I have purchased the corn at 25 cents per bushel. From 50 pounds of corn meal I have made 6 gallons of molasses of 28° Beaume, which is equal to about $31\frac{1}{2}$ pounds of sugar. Such molasses are not so sweet as those of the sugar cane; but their taste is pleasant and not quite so bitter as those made of the sorghum.

F. A. HOFFMAN.

Beardstown, Ill., Aug. 12, 1863.

BLACKBERRIES are the only luxury of the soldier, at present. Virginia is one vast blackberry field, and it is said, in consequence of living on this diet, the army never was in a better sanitary condition. The surgeons say that since the army returned to Virginia, the free use of blackberries had saved the Government nearly a million of dollars in medical and hospital stores.

Trial of the "Manhattan" Steam Engine in London.

The *Mechanics' Magazine* has the following paragraph on this subject:—"This engine, which has received a partial repair at the hands of Messrs. Shand and Mason, underwent some experiments on Saturday, in the presence of a numerous body of engineers and others concerned in such matters. The trials were conducted at the Shadwell entrance to the East London Docks; the site was extremely convenient for testing alike the drawing and forcing powers of the machine, the vertical distance from the rotary pump to the surface of the water in the basin being nearly 15 ft. Steam was got up a little after 1 o'clock; the times and pressures were nearly as follows:—In 11 m. from the application of the match, the engine got to work with steam at 20 lb., drawing water immediately, without priming the pump; in $14\frac{1}{2}$ m. the pressure was 40 lb.; in 15 m. 45 lb., when the engine was stopped for a short time; in $15\frac{1}{2}$ m. the pressure was 55 lb.; in 16 m. 60 lb.; at 62 lb. the engine started, throwing a very steady jet through a $1\frac{1}{4}$ in. nozzle to a distance of about 150 ft., with a pressure in the air-vessel of about 80 lb.; in 18 m. 40 s. a pressure of 100 lb. was reached, with 140 lb. in the air-vessel. The engine making about 280 revolutions per minute, some very fair work was done; but at this juncture a leak was sprung in the boiler, which, though very trifling, so far damped the fire as to render it impossible to keep steam. After a little time the leak stopped itself, and the fire was re-lit, but without producing any very good results. Whether from a defect in the quality of the coal, or that the boiler has been more injured than appears at first sight, it was found impossible to keep up the water supply and the pressure in the boiler at the same time; the introduction of the feed pulling down the pressure with a rapidity which was very remarkable. The engine and pump of the machine leave little to be desired; but the boiler, if it cannot accomplish better results than any we have seen, must, we fear, be pronounced a failure. After a couple of hours, the coal provided having been consumed, all further trials ceased, the engine returning to London.

A Rainy Month.

July, 1863, will be remembered as the rainy month, especially by farmers, who paid \$56 a month to hay-makers. J. P. Hall, of Hancock street, Boston, informs us that, during the month of July 12 36 inches of water fell in this city; the average fall for July, for 38 years here, having been 3.42 inches. Excess 8.96 inches. During the present year, at the end of seven months, 42 31 inches of water had fallen. The average for the first seven months, for 38 years, is 24 37 inches. Excess in the present year, 17.94 inches. In August, 1826, 12 10 fell; that was a remarkably unfavorable month for haymaking in western Massachusetts. That year the 'September scythes' rung to an almost unprecedented rate. In November, 1840, 11 63 inches of water fell; and in August, 11.11 inches fell. Thus, July stands ahead of any corresponding month in the record that we have access to at the time of writing. Down to the 8th day, only .03 of an inch had fallen. In Lowell, from the 6th to the 29th, 10.023 inches fell, or about one-fourth the usual annual amount. In Lawrence, the amount was 8.75 inches. Farmers have been great sufferers, and it is feared the herds and flocks will be, on the coming foddering season. As the quality of the grass must have been greatly impaired, both by the rains and the ripening thereof, before it can be cut and made, as the season is quite advanced; the time having come when haying, for the last ten or fifteen years, has been finished, though formerly it was much later. At Harvard College Observatory, Cambridge, the fall of rain in July was 12.43 inches, or very nearly the same quantity as in Boston. The extremes of the thermometer in July were 87° on the 3d, and 55° on the 24th—range 32°.—Boston *Cultivator*.

SMALL as Connecticut is, she can boast of having nearly 3,000 industrial establishments, and a capital to the amount of \$46,000,000 invested in manufacturing business, giving employment to 60,000 hands. If we add together all the industrial products of North Carolina, South Carolina, Georgia, Florida, Alabama, Texas, and Mississippi, then Connecticut is \$20,000,000 in advance of them all.

Building and Heating Houses.

As houses have always been built, there is great loss in heating them, except by the use of a stove with a long pipe, or a hot-air furnace; the latter placed in a room which you wish heated, instead of in a cellar or basement, where the heat from the furnace is lost. In grates and fire-places, I presume fully three-fourths, if not more, of the heat goes up the chimney and is lost. These are the most healthy and pleasant, and we, therefore, generally put up with the loss of the heat for the sake of their superior comfort and convenience.

But is there no way to build a house whereby we can combine the economy of the stove and pipe with the advantages of the open fire-place? If it could be made to draw well I would propose hollow outside walls, made of three instead of two walls. The first cost of a house would be somewhat increased by building in this manner; but the more uniform temperature of the atmosphere within, to say nothing of economizing fuel, would much more than compensate for this increased cost, with all by whom comfort and good health were the chief objects desired. The outside wall would absorb all the moisture and frost, requiring none of the inside heat to neutralize it; and the air between it and the middle wall would be a good non-conductor. Then let the heat from the fire-places pass between the inside and the middle wall, making the whole circuit of the house, from bottom to top, and finally escaping with the smoke from short chimneys or ventilators in the roof. Thus all the heat would be economized, and a temperature be imparted to the inside wall, and from that to the room, sufficient, with the fire in the open grates, to warm a building in the most agreeable manner. The heat from the kitchen range also may be thus used. The Russian stove is made upon this principle, and I never experienced more agreeable heat than its finely polished walls give out into the rooms.

With such walls, a house would be cooler in the summer and warmer in the winter; making the temperature much more equable throughout the year. A flue may be introduced to carry off the heat from the kitchen range in the summer.

I have but one fear about this system, namely, whether a good draft can be got between such open walls? Each fire-place should have its own division of space to heat; for, if there is more than one opening, of course there could be no good draft.

Another great advantage in hollow walls is, that you can plaster on to the inside wall, and thus make your house rat, mouse and even bug proof. All these creatures to me are an intolerable nuisance, and should never be permitted in any decent house.

A.

Observations on Rain in a Balloon.

Mr. Glaisher, the English aeronaut, has published an account of his thirteenth ascent, in a balloon, for scientific purposes. It took place on the 26th day of July last, from the Crystal Palace at Sydenham. His objects were to determine whether there was a stratum of cloud at a certain elevation above that from which the rain drops fell; also to determine the size of the rain drops at different elevations. Mr. Glaisher's conclusion is, that whenever rain is falling from an overcast sky there is a second stratum above, but with an overcast sky and no rain, then the sun is shining on the upper surface of the clouds. In regard to the second point, he says:—"The size of the rain drops as they fell on my note-book before starting, was fully as large as a four-penny piece; they decreased in size on ascending; but our upward movement was too quick, and we soon passed out of rain. On descending from above the clouds, we first encountered a dry and then a wet fog; passed into that which may be described as damp air or exceedingly fine rain; then experienced very fine but decided drops of rain, like pins' points, covering the note-book; these increased in size on approaching the earth, but more rapidly when very near the earth. The drops of rain, on returning to the earth, were as large as those noted on leaving, and rain had been falling heavily all the time we were in the balloon."

ERRATUM—WIRE PLATES.—In the useful table published on page 108, current volume of the SCIENTIFIC AMERICAN, the heading "Plates—per Lineal Foot," should be "Plates—per Square Foot."

WORKING STEAM EXPANSIVELY.

The Government has appointed a new series of experiments to be made, upon the subject of working steam expansively. These experiments will take place under the direction of two commissioners—Horatio Allen, Esq., President of the Novelty Iron-Works, in this city, and B. F. Isherwood, Chief of the Bureau of Steam Engineering, at Washington, D. C. These trials are to be conducted in the most careful manner, and with entirely new mechanical apparatus, constructed expressly for the purpose, with a view to great precision in the results. The arrangement of the machinery is known to us, and we shall enlighten our readers upon the details at an early day, laying the results of the experiments before them as soon as they are completed. We think these trials, for there will be several, will be conclusive, and settle this vexatious question at once and forever.

MISCELLANEOUS SUMMARY.

ENGINEERS ON CAPTURED VESSELS.—Engineers in the Navy who are transferred to prizes are usually supposed to have a fine time; the following extracts from a letter to a daily paper will serve to disabuse the minds of those who entertain such ideas:—"The lamps are trimmed and watches set, and all hands prepared for a lively time; but a storm springs up and causes our vessel to leak. The pumps went work, being choked with fine coal. Fisher goes down into the bilge, and stands, up to his waist in water, till he gets the bilge pump in operation; but that only lasts a short time, for it soon gets choked again, and recourse is had to the bilge injection, which keeps the ship clear. All night we worry along, with the expectation that morning will bring relief; Fisher and myself having been passing coal and firing up with but few hours rest since we came aboard. Jones has just carried away the check-valve on the after boiler, and we have had to haul the fires, &c." It was very culpable in "Jones" to carry away the check-valve. He should have been put in irons, or made to bring it back instantly.

OIL REMEDY FOR FLIES.—The New Haven *Courier* says:—"The annoyance of these summer pests to animals can be greatly mitigated, by the use of a mixture of one-third kerosene oil, and two-thirds lard oil, applied to the legs of horses, oxen or cows, with a feather or brush; or, what is better, but more objectionable to the applier, with the hand, rubbing it well in. A farmer in the neighborhood used it last summer on his oxen, having it applied twice a day on their going out to work—morning and noon. His cattle gained in flesh during fly-time. I have used it on horses and two cows. Its benefit is immediately observable. A horse, uneasy, fretting and stamping, becomes at once quiet, after the application. Those who sympathize with the noble animals in the constant teasing endured by them from these pests, will be glad to use any harmless remedy, which will spare incessant work, when not called to labor in harness. Horses will keep better on a less supply of food, for the repose thus obtained."

A BIG BLAST.—The Lake Superior *News* notices a remarkable blast, which took place near Marquette recently. In ordinary blasts, a hole of an inch and a half in diameter is drilled; but in this case one of four inches and eighteen feet deep, was made, distant from the edge of the cliff about ten feet, into which one keg of powder was put, and exploded as preliminary, which had the effect to open a seam to a depth of fifty feet. Sixteen kegs of powder were then put in as a final charge, which threw down over 3,000 tons of ore, so completely broken up, that the largest portion was small enough to load on the cars for shipment, without further reduction.

USEFUL HINTS.—Never enter a sick room in a state of perspiration, as the moment you become cool your pores absorb. Do not approach contagious diseases with an empty stomach; nor sit between the sick and the fire, because the heat attracts the thin vapor.

COAL MINING.—Statistics of the Pennsylvania coal trade for the present season show an aggregate production of nearly 5,000,000 tons, against less than three and three-quarter millions to the same time last year.

THE "IRONSIDES" AT FORT SUMTER.—The manner in which the armor of the *Ironsides* has thrown off the rebel shot causes general satisfaction, though she has not yet been closer than 1,800 yards to the rebel batteries. Most of the heavy shot have crumbled to pieces on her solid sides, and the rifled shot have only made indentations without doing the slightest damage. She has received two 10-inch shot on her port stoppers, and even there they only made indentations without doing any harm to them. The steel-pointed shot have made cuts about an inch deep. She will, however, be tested within 800 yards when the great assault is made.

GRAPES AND MUSHROOMS.—It is a curious coincidence that when the vine disease appeared the common eatable mushrooms entirely disappeared. In the districts of Maçon, Lyons, and the banks of the Rhone, which were great sufferers from the oïdium, this vegetable has again appeared. Whether there is really any relation between the reappearance of the one and the disappearance of the other, remains to be seen; but it is not unnatural that the vine-growers should believe and be fully convinced that there is.

ABUNDANCE OF PRAIRIE CHICKENS.—The *Dubuque Times* says that "never since Iowa has been settled by the white man, have prairie chickens been as numerous as at the present season. In Buchanan and Blackhawk counties, they can be killed with stones and clubs; and hunting them with guns is next to no sport at all. So plenty are they that the farmers importune hunters to try their luck on their grounds; and in some instances they have manifested a willingness to pay for the killing."

NEARLY every gate in the city of Vicksburg is now adorned with an unexploded 13-inch shell, placed on the top of each post. The porches and piazzas also (nearly every house has one) are ornamented with curious collections of shot and shell, which fell on their premises during the bombardment of the city by the Federal forces.

THE greatest capture of men related in modern history, is that of Napoleon at Austerlitz, where he took 20,000 prisoners. Gen. Grant at Vicksburg, took 31,000. The spoil at Austerlitz was 150 pieces of artillery; that at Vicksburg is set down at 238.

A VIADUCT for foot passengers is to be built over Ludgate Hill, London, a crowded thoroughfare. Why not build a similar arrangement over South and Water streets, in this city, to enable people to get to the ferries?

THE difference between rising at 5 and 7 o'clock in the morning, for the space of 40 years, supposing a man to go to bed at the same time at night, is nearly equivalent to the addition of ten years to a man's life.

ADVICES from Labrador state that the fisheries on that coast, both for cod and salmon, have been unusually successful. There are, however, but few American vessels on the ground.

A PIANO, four feet long, nineteen inches deep, and three feet four inches high, with a compass of seven octaves and a full rich tone, has been introduced into London, and is sold at less than a hundred dollars.

IMMENSE guns for the New York harbor fortifications are constantly arriving from Pittsburgh. The forts will not lack armament, whatever may be other delays or deficiencies.

LONDON streets are in a very crowded condition. St. Swithin's Lane was blocked up for eight hours and ten minutes, out of ten hours, on three specified days.

THE Woolwich Select Committee have discarded cast-iron altogether, as a material for rifled guns. They recommend coating shot for rifled guns with lead.

THE *Wool Grower and Manufacturer*, San Francisco, Cal., states that hundreds of tons of coal are now furnished by the Mount Diablo coal mines.

THE French cavalry use scabbards which contract to half their length when the sword is withdrawn. How are they made?

TWO British forgers of Yankee greenbacks have been sentenced, one to 15 months hard labor, and the other to 4 years penal servitude.