little nook surrounded by giant cliffs. Fine trees and overhanging shrubbery grow upon their banks. The deep, clear waters look darkly blue, and an indescribable serenity rests upon the scene—a sort of Sabbath silence, as if Nature was at her devotions, and not to be disturbed by worldly cares. These lakelets are full of speckled trout, some of them of great size. They are often taken of the weight of three pounds. We also visited the Vernal and Nevada falls in the valley. After riding a couple of miles, we dismounted and followed our guide along a blind pathway, over rocks, through thickets, and across streams for two miles further, until we entered the deep ravine into which the Vernal fall precipitates itself. There the trail ascends a narrow ledge, which seams the face of the mountain, at a frightful distance above the mad whirling river below. The pathway is very steep, very narrow, and not without danger. We stood upon the very verge of the cataract in perfect safety. The table-land through which the river rushes after its first great leap—the Nevada falls—until it takes its final plunge over the Vernal fall, is the wildest and most desolate region one can imagine. It looks as if a hurricane had swept over it at no remote period. The mountain sides are verdureless and bare, and not a living thing, bird or beast, or sound, but of the cataract, greets the eye or ear of the adventurous tourist. All is silence and desolation. A few dwarfed manzanitas have found root among the rocks, and we saw occasional clusters of the Alpine rose and a few fine portulaccas, covered with fragrant yellow blossoms. The river is something fearful, as it dashes furiously along its rocky channel, whirling and eddying, and leaping in fierce fury. Around and below, on every side of us were giant cliffs, huge domes, and great rugged rocks lifting their bare and weather-beaten heads into the very sky. There was no sound of human life—no sign of human habitation anywhere. We seemed to be all alone in the world.

"We spent three entire days in the valley. One can spend a week there without weariness; but for all purposes of mere sight-seeing, three days are sufficient. The Pohono or Bridal Veil, is perhaps the most regularly beautiful of all the falls, leaping, in one unbroken bound, 940 feet. It is seen to the greatest advantage between the hours of four and six in the afternoon, when the light falls upon it in such a manner as to produce most marvelous effects in the way of rainbows."

DISCOVERIES AND INVENTIONS ABROAD.

Manufacture of Copper and Brass Tubes.—A patent has been taken out by J. J. Laveissiere, Paris, for an improvement in manufacturing tubes from hollow ingots of copper or brass. In order to obtain a sound hollow ingot or cylinder of the metal or alloy, the patentee runs into a mold of the shape required for the exterior of the ingot the requisite quantity of the melted metal or alloy, it being either poured in at the top or run in at the side, and as soon as the metal or alloy has nearly, but not completely set, a mandrel is forced down into the metal. This is effected by means of a screw or otherwise; the mandrel is not, however, forced quite to the bottom of the mold, so that one end of the ingot will be closed; or it may be made with an internal flange only at its end. The metal is thus compressed and the volume displaced by the mandrel is caused to rise up around the core, and to fill the mold. As soon as the metal or alloy has sufficiently set to retain its shape, the mandrel is raised from the mold. In order to draw out the hollow ingots into tubes, he employs a system which allows of the metal being worked hot or cold. This system consists in employing grooved rollers, between the grooves of which the ingot is either pushed or drawn by a mandrel forced forward in any suitable manner, and in order to be enabled more quickly and regularly to draw down the tube, he employs two sets of rollers placed close together, one after the other, the axes of one set being vertical, and the other horizontal. The grooves in the second set are also made smaller than the grooves in the first set. The tube will thus nearly simultaneously be nipped by the rollers in the two directions. After the thickpess of the tube has by this means been considerably diminished, the tube is completed by being drawn through dies in the ordinary manner.

Medico-galvano-electric Apparatus.—E. T. Hughes, of London, has obtained a patent for improvements in apparatus for applying electricity in cases of disease—a practice now becoming quite common. The invention consists of various arrangements of galvanic apparatus, adapted to every part of the human body. When adapted to the head the patentee employs a wig spring, and solders to one end a silvered copper plate, of any required size and shape, having a shallow cavity formed in it for containing a conductor, consisting of several folds of flannel sewed together. On the rim outside the cavity he places a ribbon of silk, and fastens it to the conductor, over which and the silk he places a zinc plate, and clasps its edge by the rim of the silvered copper plate, the said zinc plate fitting the part of the head against which it is to be placed. The two plates are insulated by the silk between them, and the double folded rim is pressed air and water-tight; the same construction is applied to the other end of the spring, but the plates are changed—that is, the plate having the cavity is formed of zinc, and the plate which fits the head and covers the conductor and insulator, of silvered copper plate. At the top of each cavity there are two openings, one larger than the other; the larger for the passage of the fluid for molstening the conductor, and the smaller for allowing the air to escape: which openings are to be perfectly closed when the cavity is filled. The fluid employed is vinegar or dilute sulphuric acid, either of which may contain a small quantity of weak alcohol, to enable the fluid to be quickly imbibed by the conductor. When both conductors are moistened, the development of electricity is immediately perceived by the cracking noise; and when the inner plates are fitted in opposite positions against the head the galvanic current passes through it. When the apparatus is to be used for passing a galvanic current through the body from the foot to the wrist, or other parts, he uses a similar arrangement of plates, conductors, and openings to those before described; but makes them of such size and shape as the requirements demand.

Treatment of Gas with Acid.—A patent has been taken out by John Leigh, of Manchester, England, for obtaining nitro-benzole from gas. The invention consists in subjecting gas made from cannel coal used for illumination, to the action of nitric acid, by which nitro-benzole is obtained. The method of proceeding is as follows:—"Into a series of earthenware vessels, in the form and arranged in the manner of Woulfe's bottles, is introduced a quantity of fuming nitric acid, and through this is passed a current of gas, the operation being continued so long as any action is exerted by the acid upon the gas." When the operation is completed, nitro-benzole is found condensed in the bottles; which may be separated with a faucet, and employed for the manufacture of aniline colors. The gas thus treated, however, is liable to carry over some acid in the pipe. To prevent this, it is passed through an alkaline solution or moist lime, to neutralize the acid.

Refining Petroleum.—The following is the substance of a patent granted to E. V. Gardner, Professor of Chemistry, London. This improvement relates to the use of both high and low pressures, and superheated steam in connection therewith, by which means all risk of fire and explosion is obviated, and the various distinct compounds which are contained in ordinary mineral oils are separated, if necessary, in one continuous operation. The apparatus consists of a shallow and wide vessel, or still, which is kept supplied with mineral oils from a service-pipe. This vessel, or still, is provided with several conducting-tubes, each one leading to a separate condenser, and terminating in a distinct receiver, which, for convenience and safety, should be buried. The oil, previously treated with chlorides, perchlorides, or hyperchlorides of iron, zinc, tin, lime, soda, or manganese, or any such compounds, or a mixture of two or more of them, is run from the agitator, in which it has been thoroughly treated with the above named substances, into the still, or the oil and chlorides are introduced without agitation. Steam of low temperature is allowed to enter by a pipe, and traverses a perforated coil in the bottom of the vessel, escaping with the light oils, and passing off to its condenser. High-pressure steam is now introduced into the same coil by means of convenient pipes from the same or another boiler, and the product of this second process passes off to its distinct condenser and receiver-pipes, the others being closed. Superheated steam is next passed from a third source, through the same coil, the former pipes being closed, and passes by a third condenser-pipe to its receiver. These condenser pipes are fitted with taps for use as required. The remaining dead oil is run from the vessel through a tube or pipes to a general receiver while hot, and submitted to further distillation.

If the oils be not previously agitated and treated with chloride or chlorides, but introduced with them into the vessel, then, after being submitted to steam at 212° Fah., and at high pressure before the introduction of the super-heated steam, the mixture must be allowed to subside, and the solution of chloride run off. The remaining oil is then treated as if chloride had not been present. In these processes neither acids nor alkalis must be allowed to come in contact with the oils previous to the above treatment, as by the action of the acid the oil is considerably carbonized and the production in pure oil lessened.

Breech-loading Ordnance.—A. F. Blakely, London, the inventor of the Blakely gun, has taken out a patent for an arrangement of breech piece, which is opened by the recoil of the gun, when the shot leaves the muzzle, so as to permit the gun to receive a fresh charge without further trouble. The breech piece enters the barrel to an extent sufficient to insure its not leaving the breech end until the shot passes out of the muzzle.

NEW BOOKS AND PUBLICATIONS.

SYSTEMS OF MILITARY BRIDGES; by Brigadier-General George W. Cullum, Lieut-Colonel Corps Engineers, U. S. A. Published by D. Van Nostrand, at 192 Broadway, New York.

This is a handsome scientific and practical work, illustrated by a large number of wood cuts and lithographic plates. The author is an accomplished military engineer, and is Chief of Staff of the General-in-Chief of the armies of the United States. The different systems of military bridges adopted for the armies of the European Powers, as well as those in use in America, are very clearly described. The passage of rivers is considered the most difficult and hazardous of all military operations; and no army should take the field without means to overcome all obstacles. The importance of military bridges, during our present war, affords good reason for the production of this work at the present time. The experience of our army on the Chickahominy and Rappahannock has shown how the fortune of war may be borne upon a few frail pontoons. Military bridges should be light and strong, easily put up, taken down, and transported. The American india-rubber pontoon bridge is fully described, and appears to surpass all other portable bridges. The first india-rubber pontoon bridge experimented with was in 1836, by Captain John F. Lane, U. S. Army; it is 350 feet in length, and was thrown over the Tallapoosa river, in Alabama. Such bridges were afterwards practically used in the Mexican war, under the charge of General Cullum. The pontoons consist of vulcanized india-rubber cylinders, divided into compartments, and when used for a bridge, they are inflated and anchored at intervals of about 18 feet apart, parallel with the current of the river. They thus form floating piers, upon which the plank roadway and superstructure are laid. When the bridge has to be lifted, the superstructure is taken apart, the pontoons are taken out, and the air expelled from them; when they may be packed closely in suitable wagons and easily transported to their next destined position. The French have borrowed the construction of such military bridges from American engineers. General Cullum describes a remarkable instance of American engineering originality and energy in the erection of a temporary railroad bridge across the Potomac Creek, by Brigadier-General Herman Haupt, C. E. It was put up to replace one burned by the rebels; was 400 feet long, 80 feet in hight, and the labor was done by the soldiers. It was constructed of trees cut from the forest in the vicinity, in May 1862; and only nine working days were occupied in its erection.

General McDowell, in his defense before the Court of Inquiry, said respecting it:—"It is a structure which ignores all the rules of military science, as laid down in books. It is constructed chiefly of round

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 feet 6 inches ÷ 2 = 3.9 inches the length of crank.

(2). 3 feet 9 inches × 8 = 30 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 Historic-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 Rytting-huisen, 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.

CORRESPONDENCE

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 cheep. In repeated trials, I have obtained 5½ 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 31½ 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 14½ m. the pressure was 40 lb.; in 15 m. 45 lb., when the engine was stopped for a short time; in 15½ m. the pressure was 55 lb.; in 16 m. 60 lb.; at 62 lb. the engine started, throwing a very steady jet through a 1¼ 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 haymakers. 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.