der direction of the Navy Department. It has fired five hundred rounds with fifty-pound charges of powder, and with solid shot weighing 280 pounds. Its greatest enlargement during this enormous test was 87-1000ths of an inch; and there is not a visible defect to warrant a doubt of its capacity for another five hundred rounds. It is safe to declare that no gun in this or any other country has ever been subjected to and withstood a severer test.

"The guns made here are fabricated from an iron composed of hematite and magnetic ores, obtained in the vicinity of Reading. The magnetic oxides occur in the range of mountains known in Virginia as the Blue Ridge, and on the Susquehanna as the Conewago hills. The iron is associated with silex and feldspar, and generally occurs in rocky veins. When it is free from sulphur, and mixed with suitable proportions of hematite, it produces iron of the highest quality, and adapted for almost any desired purpose. The magnetic variety is what is termed a neutral ore, and makes iron of extraordinary strength and hardness, which may be modified at pleasure by the introduction of hematites. The success achieved in the manufacture of ordnance has created an unusual demand for that particular variety of metal, and it is eagerly sought for, not only by the gun foundries of Pittsbugh, Trenton and the East, but also by the manufacturers of wire, screws, cutlery, and every variety of iron requiring peculiar strength and hardness. Indeed, large quantities of the raw ore have already been sent to remote points—in some instances they have been hauled a distance of fourteen miles by wagons, and then shipped by railway a distance of 360 miles to be smelted. These facts indicate not only the local value of the iron mines tributary to Philadelphia, but would seem to justify the expenditure of large capital to manipulate them into the different manufactories now successfully carried on in distant regions under the stimulus of a more enterprising spirit.

"I may add, in conclusion, that the credit of making the strongest gun ever cast in the world belongs mainly to James McCarty, of the firm of Seyfert, McManus & Co. It was through his experiments in securing a proper combination and treatment of ores that the highest strength was secured to the metal; and although the task would now appear to be simple enough, yet at the outset it involved a vast amount of patient labor and research, the benefit of which will ultimately accrue no less to his fellow-countrymen than to himself. ELI BOWEN."

DEFECTS OF THE BRITISH IRON-CLADS.

We republish the following sensible remarks from an editorial in *Mitchell's London Steam Shipping Gazette* :—

"For sea-going ships the deck battery is a defect, for, no doubt, such vessels would roll badly. The weights could not be properly distributed. They would lie much better with the addition of guns between decks. No better specimens of war ships have ever been constructed than the two rams built by Messrs. Laird at Birkenhead. These vessels are armor-plated from bow to stern, and have projecting beaks. If one of them were to steam bow on to the *Warrior* or *Black Prince*, she would probably crack the unprotected hull of these big ships under water like egg-shells.

"We believe there is not a perfect iron-clad yet commissioned in the Royal Navy. All the partially-armor-plated vessels must roll in a seaway, and then they expose common iron-built hulls below the load-line, with screw propellers inviting well-aimed shots. No nation has succeeded in solving the problem of turning out vessels quite impenetrable and yet lively at sea. Our *Warrior* class are certainly magnificent ships, but they are expensive ones. They all leak badly, and require constant docking. The *Minotaur* and *Northumberland* carry their armor plating from bow to stern, but they are propelled by one screw, and are not adapted to attacks in shoal water, from their great draught. Mr. Reed, the Constructor of the Navy, has designed a new class of ship which, we suspect, will be found suitable for sea-service; and, as he is not wedded to ancient ideas, he may yet improve our fleets by attending to the suggestions and advice submitted to his department, and keeping pace with the advanced notions of those who give their attention to naval architecture."

Correspondence

Laplace's Correction for the Velocity of Sound.

MESSRS. EDITORS:—I wish to place on record in the SCIENTIFIC AMERICAN, a single numerical result of experiments made on a cubic foot of air, and repeated a score of times, from 1852, up to present date, 1864, for the purpose of verification. I wish to place it on record, because I know the attention of several European physicists is directed to this point at the present time.

Experiment.—A cubic foot of air was heated from 32° to 522° under constant pressure, thereby doubling its volume by expansion, and raising 144×15=2,160 lbs. 1 foot high. The same cubic foot of air was afterward heated from 32° to 522° under double pressure, and with a constant volume.

Now, in these two experiments, the quantity of matter heated is the same—one cubic foot of air; the range of temperature is the same—490°; but the quantity of heat imparted is not the same in both cases. The quantity applied, when the pressure is constant and the volume variable, is to the quantity applied when the pressure is variable and the volume constant, as—1·41724 : 1·00000.

In other words, 0·41724 additional grains of combustible matter were consumed in producing heat that lifted 2,160 lbs. 1 foot high. I wish to place this result on record, for the ratio of the two specific heats used by Laplace in his correction of Newton's formula for the velocity of sound, and also used by Meyer, Dr. Tyndall and other eminent physicists, for computing the mechanical equivalent of heat, is 1·421.

When Newton calculated the theoretical velocity of sound in air by means of the formula

$$v=\sqrt{\frac{e}{d}}$$

in which v represents velocity, e elasticity and d density, both at zero; he found that it differed from the observed velocity by about one-sixth of the whole amount. In this calculation, Newton only considers the changes of elasticity due to changes of density; but Laplace accounted for this deficiency by assuming that the effective elasticity is augmented by changes of temperature produced by pressure in the condensations and rarefactions of sonorous waves. So that, according to Laplace, the effective elasticity must be multiplied by the square root of the quotient obtained by dividing the specific heat of air at constant pressure by its specific heat at constant volume.

But since the ratio was then not known by actual experiment, Laplace reversed the process of his calculation, and deduced from the velocity of sound, which had been well determined, the ratio of the two specific heats, which he found to be 1·421. The excess of 0·421 is now used to express the amount of heat consumed in external work, when the air is allowed to expand under constant pressure. And from this number also is deduced the mechanical equivalent of heat. But my own direct experiments with a cubic foot of air (made with great care, under favorable circumstances and with the best instruments) prove that this excess is too much; the correct value is between 0·417 and 0·4173, and the average is 0·41724.

Laplace's correction is purely inferential, and its correctness depends on the assumed value of the velocity of sound *with no allowance for radiation*. Although air is practically a vacuum, as regards the radiation of heat, and has no sensible power to neutralize, by radiation, the differences of temperature in the condensed and rarefied portions of a sonorous wave; yet the vapors mixed with the atmospheric elements —in the lower strata of the atmosphere especially, where the velocity of sound has been tested experimentally—are competent to neutralize this difference, because they have been proved to possess a sensible power of absorption and radiation. They will, therefore, so far diminish that portion of the elastic force on which Laplace's correction depends, that a less ratio for the two specific heats must be deduced from the velocity of sound, and more in accordance with the ratio I have deduced from direct experiment—it must be nearer 1·41724 than 1·421.

Dr. Tyndall's recent experiments on the radiation of vapors in the atmosphere, cited in his recently-published work on "Heat as a Mode of Motion," and his anticipations in the form of a "note" in the *Philosophical Magazine*, coupled with the published views of other eminent physicists, all lead to the expectation of a correction in Laplace's formula, and a slight diminution in the excess (0·421) which his formula gives, which deduction is due to radiation from every condensed portion of a sonorous wave. Direct experiment with atmospheric air is the only satisfactory mode of settling this question; and my experiments, made for this very purpose, and often-times repeated, prove that the ratio of the two specific heats for condensed and rarified air is as 1·00000 to 1·41724.

S. BESWICK.

Brooklyn, N. Y., January 30, 1864.

Ventilation of Public Buildings.

MESSRS. EDITORS:—I presume that there are very few who have not suffered from the inconvenience of ill-warmed and poorly ventilated public buildings, but more especially churches. When these last are of modern construction and high in pitch, open timbered and with lead sashes, it is a difficulty to treat them; and this difficulty, particularly in country places, is rarely overcome. I have recently furnished the plans for a building of this kind, and the method of warming and ventilating that I have adopted has proved so efficacious and is withal, I believe, so novel, that I am led to offer in your columns a description of it for the benefit of others.

The building that I had designed and purposed warming was a church of the usual cruciform style, having a nave and transept. The whole length of the nave in the clear is 82 feet, while the arms or transepts are 12×30 feet; the hight of roof to ridge, 32 feet; the side walls, 12 feet. My plan was to do away with the great absorption of heat in the mass of masonry usually surrounding a furnace, and to take the whole space under the church for a hot-air chamber. The foundation was well laid and the wall closely built, making all tight up to the sills. I caused the ground to be excavated under the cross section to the depth of 8 feet, and about the same size as the transept; thus making under that part of the building a room of 11×24 feet. From this the ground was excavated on an inclined plane up to the extreme end of the church, where the distance from the floor to the ground was about 18 inches. The entrance to this room was from the end of the building near the transept, in which, as usual, was a door under the floor. Into this space below, two chimneys (carried up through the wall) entered and carried up the smoke of two large-sized "box stoves." These stoves had pipes of some twelve feet in length, to secure the transmission of all the heat ere entering the chimney. Directly over the stoves two openings in the floor formed registers, 4×3 feet, capable of being opened or closed at pleasure. Then in all the seats, at such distance as the feet of persons sitting or standing would come, there were bored in the floor with an inch auger, five holes, in diamond form, making a kind of small register to each person.

The system of heating is this :—The inclined plane of the ground under the floor, through the whole length of the building, acts as a *descending* grade for the cold air dropping through all these numerous apertures in the floor. The cold air flows down and is drawn toward the stove in the chamber, either for combustion or heating. The hottest air meantime, passing directly up through the large opening over the stove, ascends into the building and aids in pressing down the colder air falling through the other apertures. The result is that the building is heated with great rapidity; two or three hours sufficing for doing what an ordinary furnace would, by mere radiation or compression, require six or seven hours to accomplish.

When the time for divine service has arrived and the congregation have assembled, the registers over the stove are to be closed and the process thus far going on is in a degree reversed : the warm air then flows *up* the inclined plane pressing against the floor and rising through the numerous openings, to the feet and clothes of the individual seated or standing above, effectually warming them. By this contrivance the air above, instead of being much (as usual with one column of furnace heat) hotter than that around the feet, really becomes—during the service—cooler; while the warmest air continues to ascend, entangled with the persons and clothes of the audience. It is a known fact that if the feet and lower limbs of persons are kept perfectly warm, a far lower temperature suffices for the body. In most buildings precisely the opposite course takes place, the air above and around the head and near the ceiling being heated to an intense degree, the feet and floor remaining cold. The plan I have adopted prevents this, as the floor itself is entirely warm, and the currents of warm air ascending keep the whole assembly in comfort. The cheapness of the method also recommends it, as there is no cost for anything but the box stoves and excavation. The earth itself, being a poor conductor of heat, is left without paving.

Of course, in very large buildings my plan would not be practicable, but in most of those designed for 400 or 500 persons it is so; and my experience with the building I have mentioned shows that most country churches may be warmed thoroughly without the unsightly-looking stoves and pipes, or the expensive furnaces.

R. WHITTINGHAM.

Small Traction Engines.

MESSRS. EDITORS :—On page 9, Vol. IX (new series) of the SCIENTIFIC AMERICAN, in an editorial article headed "Agricultural Machines," you stated as follows :—"In conversation, a few days since, with a most intelligent Western farmer, he told us that manual labor was so scarce in the country last autumn, that but for horse-rakes, mowers and reaping machines, one-half of the crops would have been left standing on the fields." That Western farmer told you the truth; at present, the demand for manual labor is daily increasing, as is also the want of agricultural machinery.

In another editorial article headed "Steam for Agricultural purposes" (immediately following the one above alluded), you wrote thus :—"The application of steam to the business of farming has not been as general in this country as we could wish. Neither, from present appearances, are we very sanguine that it will become popular. We are at a loss to account for this very general indifference of our farmers on what would seem a matter of vital importance." Permit me to state that the farmers are *not* so indifferent as you suppose them to be; but, not being able to obtain machines adapted to their wants, they use such as they can get.

One of the greatest wants in the grain-producing portions of the North-western States is a portable traction engine, of about eight-horse power. The thousands of threshing machines which thresh millions of bushels of grain annually, are mostly each driven by the power of eight horses; this being the hardest work to which horses can be subjected upon the farm; and this occurs at a season when the horses are required for other work necessary to be done before frost sets in. Many portable steam engines are made expressly for threshing and work well; but they do not come into general use because they require from four to six horses to move them and the threshing machine from place to place; and in cases where horses have to be kept for that purpose they might as well do the threshing. Thousands of engines are wanted, that will move themselves and the threshing machine and drive the same when in operation. If there is genius enough (and who can doubt it?) in the inventive brotherhood, throughout the United States, to produce whatever is urgently *wanted*, let some one invent such an engine without delay. Thousands of farmers are ready to buy them at once.

D. McDONALD.

Verona, Wis., Feb. 1, 1864.

Precaution against Fire.

MESSRS. EDITORS :—The awful and harrowing circumstances of the late catastrophe in the cathedral church of Santiago, in South America, whereby more than two thousand human beings (chiefly women) were burnt to death, should be a warning to school trustees and others having control of large places of assemblage. Notwithstanding the fearful lessons that have occurred in the past and are likely to be too often repeated, the builders of such structures, even in this enlightened land, continue to make "traps" for men, women and children, by the altogether inadequate means provided for sudden egress. The stairways are often narrow and devious, and their still narrower doors, in the vast majority of instances, open *inwardly*. Even conceding that, for ordinary use, it is best that doors should thus open, why, in the name of mercy, not make such doors a part of still larger ones, which, on the withdrawal of a single bolt, or even with a certain amount of pressure from within, shall widely open their portals in an outward direction? But, after all, it is questionable whether the sudden calamity of the Santiago worshipers is really more deplorable than the slower but more widespread waste of nerve and muscle incident to the "high pressure" system of teaching and the exclusive use of air-tight stoves in American school-rooms. When will the community learn that to sacrifice the brains and constitutions of their offspring to a supposed saving of fuel has not even the poor plea of economy, for what production is so costly as a *child?*

G. H. KNIGHT.

Cincinnati, Ohio, Jan. 30, 1864.

Nitrous Oxide Gas.

MESSRS. EDITORS :—The fears I expressed in my first letter to the SCIENTIFIC AMERICAN, relative to the laughing gas, have unhappily been realized. One person has fallen a victim to its use. The following is an extract from the New York *Herald* of Wednesday, January 13th:—"Samuel P. Sears, 23 Park Row, died yesterday at the dental establishment of James Burnett, 373 Canal street, from the effects of 'Laughing gas,' which had been administered for the purpose of extracting a tooth. Deceased had been ill for a long time with bronchitis and hemorrhage of the lungs. He died two hours after the inhalation of the gas. Dr. George B. Banton, who made the post mortem examination, gives his opinion that death was caused by congestion of the lungs, accelerated by the inhalation of the gas."

I have no reflection to make on the above statement. It is true that the victim was in the last stage of consumption; but if the gas has proved fatal to him, how will it act on persons in the first stage who are affected with lung disease?

H. DUSSAUCE.

New Lebanon, N. Y., Jan. 25, 1864.

Strength of Steam Boilers.

MESSRS. EDITORS:—As my letter to you of the 15th inst. (published on page 71, present volume of the SCIENTIFIC AMERICAN) only gave a rule by which to calculate the strength of boilers that are single-riveted, and as it is as necessary to know the strength of double-riveted ones, I herewith forward you a table containing both:—

Plates.	Single-riveted.	Double-riveted.
1-8th-inch	2,500 lbs.	3,125 lbs.
3-16th-inch	3,750	4,687
1-4th-inch	5,000	6,250
5-16th-inch	6,250	7,812
3-8th-inch	7,500	9,375
7-16th.inch	8,750	10,937
1-half-inch	10,000	12,500
9-16th-inch	11,250	14,062
5-8th-inch	12,500	15.625
3-4th-inch	15,000	18,750

The strength of single-riveting is 56 per cent. and of double-riveting 70 per cent. of the whole strength of the plate. The tensile strength of the iron should be 60,000 lbs. per square inch, any variation from that strength will, of course, proportionately increase or decrease the rates given below. I may here again remark that by dividing the number of pounds given in the table, opposite the thickness of plate used, by the diameter of the boiler in inches, the result will be one-third of the bursting pressure of any new boiler.

WM. TOSHACH.

Schenectady, N. Y., Jan. 28, 1864.

The Relative Motions of the Crank Pin and Cross-head.

MESSRS. EDITORS :—It has been a query with me whether or not the cross-head of a steam engine, with perfectly tight boxes, stops at the end of the stroke. Does not the fact that a perfect circle (such as the wrist-pin describes) has no part of a straight line, go to prove that the cross-head does not stop; but, upon completing the stroke in one direction, immediately —without a pause—commences the return movement?

A MECHANIC.

[The fact of the crank pin describing a circle has not the slightest connection with the subject. By the mechanical arrangement of the parts mentioned the crank pin passes over a longer distance than the cross-head when on the center, and though the stoppage of the cross-head is inappreciable, a cessation of its motions does take place if the engine is at work; but for this the engine would not work. No matter in motion can receive impulse in an opposite direction, unless the first movement be absorbed or lost, and a new impetus given.—EDS.

Iron Frames and Timber Planking.

The *Commercial Bulletin*, in directing the attention of the Boston merchants to the best modes of shipbuilding (they having organized a company to establish a new ocean line of steamers between their city and England), thus describes the great strength of the Cunard steamers:—

Many of the vessels which compose it are built of wood, but so expensively, that we fear our economical commercial men would not be likely to copy their details. Not only are their frames of the best English and African oak, equal to our live oak, but they are planked and ceiled with the same material—are cross-braced with iron and double planked. The first planking is six inches thick, of oak; and the second, which extends several feet above the line of flotation, is of American elm, three inches thick. The value of such extraordinary strength, has been tested upon many occasions; but strikingly so, when the *Africa* ran foul of the rocks off Cape Race. She only damaged her fore-foot, and a part of her keel; but if she had been of iron, it is possible that she might have been lost. But recently the Cunard Company have built their most magnificent vessels of iron. The *Persia* and *Scotia*, as well as all their numerous trading steamers, are of iron. It is doubtful whether they will build any more wooden vessels. But iron is now in general use throughout Great Britain for merchant vessels of all classes.

With regard to vessels built with iron frames and wooden planking, which have been described and recommended in the SCIENTIFIC AMERICAN, the *Bulletin* says:—

Capt. R. B. Forbes, in the construction of the *Niphon*, now a gunboat in the United States service, introduced a new principle. She is a combination of wood and iron. Her entire frame, keelsons, hooks, knees and beams are iron, but she is planked with oak and coppered. The object of this is to avoid that great drawback to the efficiency of iron vessels, namely, fouling under water. She has all the internal capacity of iron, the strength and cleanness of wood coppered, and she cost about a medium price between the two. We present these three modes of ship-building for the consideration of those who are now laboring to develop our steam commerce.

Treatment of the Sting of Bees.

The organ with which bees inflict their sting consists of two barbed or rather serrated darts issuing from a sheath and placed back to back, so as to leave a groove between them. The sheath is encased in nine cartilaginous scales provided with muscles, eight of which perform the duty of pushing the weapon out, while the ninth draws it back. To increase the pain caused by the mechanical action of the dart, a poison is secreted from two bladders situated on both sides of the intestines, and it is this poison which causes the formation of a small pimple of an erysipelatous redness. This generally disappears in a few instants, but, sometimes, when several stings have been inflicted at a time, or when even a single one has injured a nervous filament, the inflammation is rather severe. In such cases, Dr. Latour proposes the following treatment:—1. To pull out the sting which generally remains in the wound. 2. To foment the place with iced water, or else extract of saturn or ammonia. 3. To apply an impenetrable coating of collodion, rendered elastic by the addition of one-tenth part of castor oil, whereby the production of heat in the living tissue is prevented and inflammation avoided.

New System of Cure.

A Turkish newspaper publishes the following advertisement:—

HEADACHE, TOOTHACHE, LUMBAGO, EYE-SORES, FEVER, &c., cured by a celebrated divine (?) just arrived from Asia Minor, by breathing on the patient and by charms. Address *Dede-Kave*, at Alserai.

If this "divine" Turk should set up an office in New York, and advertise in the papers that he could cure diseases by the power of his breath, or by the use of charms, he would have a thousand patients daily besieging his doors. If he can really cure "eye-sores" we recommend Inspector Boole to import the "divine" at once, and get him to breathe upon our filthy streets. Such an "eye-sore" is painful enough at present to warrant almost any amount of quackery.

No drill will cut well or make a fair round hole when one lip is longer than the other, or when it is too broad and thick on the point.

Submarine Firing.

As this subject is one that now attracts attention, we publish the following extracts from a record of Robert Fulton's experiments:—

"With this view he instituted a number of experiments to try the practicability and effect of discharging cannon loaded with ball at different depths under water. He made a number of calculations on this subject. His desire was to ascertain what resistance a ball, of given dimensions, propelled with a certain velocity, would meet with in passing through a body of water at a certain depth. The basis he took for these calculations and the calculations themselves mark both his ingenuity and science. He assumed that a body passing through water would meet with a resistance equal to the force of a column of water of the same diameter as the body moving with the given velocity. He then ascertained what head or weight of water would be required to discharge a stream of water from an orifice at the foot of a perpendicular tube with the same velocity with which the body was supposed to be propelled. He then, by the well-known rule of hydraulics, found what force or power the ascertained head of water would give, and thence formed his estimates as to the resistance which a body projected in water would meet with.

"In this instance, as in others, he was not satisfied with arriving at the information necessary for his particular purpose; but he established from his calculations a rule which may, by a very brief and simple arithmetical process, afford all the information and accuracy generally necessary for practical purposes. His first experiment was with a four-pounder, having the breach, and as much of the gun as is usually within the sides of a vessel, in a water-tight box, and the muzzle stopped with a tompion. The box and gun were then submerged three feet in the Hudson. The gun was fired by dropping a live coal through a tin tube which penetrated the box immediately above the vent of the gun, and rose above the surface of the water. The ball was found to have struck the sand at the bottom of the river, at the distance of forty-one feet from the muzzle. The gun was uninjured.

"This experiment satisfied him that guns might be placed in a ship, below her water-line, with their breech on board and their muzzles in the water, without any more danger of their bursting than there is when they are fired in the air. This gave him the idea of arming ships with guns to be fired in this way. He proposed that the muzzle of the gun made for the purpose should recoil through a stuffing box, and be followed by a valve, which would exclude the water when the gun was not protruded. An elegant model on this construction is now in the possession of his family. He next tried the same piece with a pound and a half of powder, and fired it by means of one of his water-tight locks, when it was entirely in water—three feet below the surface. The ball penetrated eleven and a half inches into a target of pine logs, which had been prepared for the purpose and placed beneath the water at the distance of twelve feet from the piece.

"His next experiment was with a columbiad, carrying a hundred-pound ball, fired at the target as in the last instance. All that we know is, that the ball tore the target to pieces and the cannon was uninjured. We have not information that will enable us to give any further details of this experiment, but we know that Mr. Fulton was entirely satisfied with the result. He proposed to use cannon in this way by suspending them, two for instance, from the bows of the vessel. A single shot, as he demonstrates, from a piece of large caliber, which should break into the side of a ship at any considerable depth beneath the water-line, must be fatal to her. And though the range of shot fired through water may be but a few feet, yet conflicting vessels, whenever they engage yard-arm and yard-arm (with accounts of which our naval heroes have of late made us so familiar), must be so near as to give effect to a submarine discharge.

"Mr. Fulton did not propose that these guns should be always in the water, but that they should be suspended so as to be raised when the vessel was not in action. These plans for the submarine use of cannon were submitted to one of our most distinguished naval commanders, who gave them his decided approbation. He expressed a strong opinion that such an attack would be fatal to any vessel opposed to it; and that it would be extremely difficult for an enemy to evade an attempt, made with sufficient resolution, to destroy her by these means."

A Country without a Reptile.

Capt. Hardy, R. A., writes an interesting letter to the *Field* newspaper, commenting on a statement that in Newfoundland there is not a snake, toad, frog, or reptile of any sort; nor any squirrels, porcupines, mink, or mice. Capt. Hardy says:—"Besides the above-mentioned deficiencies, I found, when visiting Newfoundland last summer, several others. It was midsummer, and the fire-flies were scintillating in myriads in the warm evenings over every swamp in Nova Scotia; here not one could be seen, nor was there another pleasing summer visitor of our neighboring provinces—the night-hawk. Considering the immense portion of this island which is claimed by bogs and swamps, I think the absence of all reptiles very curious; and I plodded long and often round the edges of ponds and swamps, hoping to see some little croaker take a header from the bank; and by sunny slopes in the woods, where, on the mainland they might be seen at every other step, in search of snakes, but all in vain. I believe some of our common green-headed frogs were recently transported to this island and turned out into a swamp such as would be a grand residence for them at home, but in a few days, alas! they all lay stiff on their backs. In fact, Newfoundland seems to be destined to remain as it now indubitably is—a country without a reptile."

American Cast-iron Guns.

The Toronto *Globe* has the following paragraph commenting upon the performance of the XI-inch gun as shown by the targets recently illustrated in the Scientific American:—"We suppose we should not be justified in arguing that in these experiments we have a sample of the best the American guns can do, but we are warranted in presuming that it offers the fair average performance of the XI-inch cast-iron Dahlgren. We cannot think it otherwise than very poor, far below the expectations we had been led to form from the system of puffing adopted. That the slight effect the shot had is not attributable to the india-rubber used in the target, is evident from the report of the officer, who says, in effect, that it penetrated just as far as in targets minus the additional protection. It is attributable to other causes, easily seen. Although the gun was only eighty-eight feet from the target faced with four and a half inch solid iron, in no instance did the shot pierce its way entirely through. We think we can show a far better record with English guns than this."

[The editor of the *Globe* has read the reports very carelessly; for just above this paragraph, in his own paper, he records the fact that the shot passed clear through. Not one target resisted them in any case. —Eds.

The Oil Supply.

The question of the ability of the oil region to supply continually the demand now made for petroleum is one which is discussed by those interested in the production and trade of the article. The wells which have been sunk are found frequently to diminish in production, and the vicinity of other wells is found also to diminish the productiveness of old wells. From the frequent striking of mud veins, it is assigned by some that the oil supply is becoming exhausted, and that these mud veins are the bottom or bed of the deposit. Some owners have found it advantageous, when a well gives out, to sink it deeper, where they find it yielding an additional quantity, which leads to the supposition that there exists several superincumbent layers of the peculiar mineral from which petroleum is derived, and the oil may be procured at the depth of a thousand feet, as surely as it is at the depth of five hundred feet. This is a matter which has yet to be tested by experiment, but the fact is a highly important one as connected with the permanent supply of an article which has become so considerable an article of trade.

Statistics of the "Reaper" Trade.

But few persons not actually engaged in the enterprise have any very definite idea of the immense proportions the business of manufacturing reapers and mowers is assuming in this country. We have reliable information, says the *Prairie Farmer*, that there were made for the trade of 1862, 33,000 of these machines; for that of 1863, something over 40,000; and, for the business of the present year, upwards of 70,000 will be made. Mark the wonderful increase since the war began. Out of the 70,000 between 14,000 and 15,000 will be manufactured in the State of Illinois. Seventy thousand machines at an average of $130 dollars each (combined machines selling the ensuing season, $150 to $160, or even higher, and mowers from $105 to $140), and we have the enormous amount of $9,100,000 paid by the agriculturists of the North, in a single season, for a single class of instruments. Probably the repairs on machines, old and new, will swell the amount to nearly $11,000,000. Can any country in the world equal or even approach these figures?

SPECIAL NOTICES.

Stephen R. Parkhurst, of Bloomfield, N. J., has petitioned for the extension of a patent granted to him on April 23, 1850, for an improvement in cotton gins.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, April 4, 1864.

William Van Anden, of Poughkeepsie, N. Y., has petitioned for the extension of a patent granted to him on April 30, 1850, for an improvement in machines for making wrought-iron railroad chairs.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, April 11, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the day of hearing.

The American Institute Clubs.

The members of the American Institute have two societies, the Polytechnic Association and the Farmers' Club, both of which hold weekly meetings free to all persons who choose to attend. The meetings of the Farmers' Club are held at 1½ P. M., on Tuesday, at Room 24, Cooper Institute, and those of the Polytechnic Association at 7½ P. M. in the same room. We intend to publish reports of such portions of the discussions of these societies as we think will be interesting to our readers. We wish it distinctly understood, however, that we cannot waste our time and space to notice every "bore" that thrusts himself into these meetings. Whatever is intrinsically good we shall publish.

The Potato Rot.

At the last meeting of the Farmers' Club, Mr. Carpenter said:—"I have read and observed a great deal on the subject of the potato rot, and the sum of the whole seems to be that potatoes planted in moist tenacious soils are much more subject to rot than if planted in dry ground."

Prof. Mapes remarked:—"I had a field, half of which was under-drained, and I planted the whole to potatoes. On the under-drained portion none of the potatoes rotted, while on the other half they all rotted."

Mineral salt is now brought in ballast from Russia; it sells for $20 a tun. It is mined in blocks that to the eye appear to be quartz. A thirty-pound block of it, placed in a box in a field, will supply a herd of cows for some weeks. It is as hard as stone. Ordinary salt would dissolve in one-fourth the time. No other country yet known yields this peculiar product. It is quarried precisely as we quarry marble.

Rimmers must not be used in the cored-out holes of castings. The scale and sand ruins the tool in a short time.

Pickling castings of iron is the best way to remove the sand adhering. One bulk of sulphuric acid to ten of water is a good bath.

The New Haven Clock Company manufactured 200,345 "movements" last year, 20,000 of which were exported.

When chipping wrought-iron the chisel should be dipped in greasy waste, occasionally; the labor is much reduced thereby.