draw largely for their supplies of coffee on the resources of the Brazils; and as it is an article of necessity for them when in a normal state of peace and prosperity, it is easy to foresee that they will become, as formerly, extensive purchasers, and pay any price for what they require. But as there is for the present a limit to the supply, the natural result will be, in all probability, that the prices of coffee in the European markets will run up to a far higher figure than even the high quotations of the present day.—*London Grocer.*

THE UNITED STATES MINT AND COINAGE.

The "Annual Report of the United States Mint and its Branches," for the year ending June 1863, has just been published. From it we learn that the amount of bullion received during the year was gold, $23,149,495 41; silver, $1,674,605 90; total, $24,824,-101 31. Deducting the bars made at one branch of the Mint, and deposited at another for coinage, the amount is $23,701,837 31. The coinage for the same period has been gold coin, $20,695,852; fine gold bars, $1,949,877 90; silver coins, $390,204 42; cents coined, $478,450; number of pieces of all denominations of coin, $51,980,575; total coinage, $24,688,-477 12.

The amount of bullion received and coined at the Mint and its branches is shown to have been: At Philadelphia, gold deposits, $3,401,374 55; gold coined, $3,184,892; fine gold bars, $156,039 74; silver deposits and purchases, $386,189 73; silver coined, $358,217 80; silver bars, $6,897 83; cents coined, $478,450. The total deposits of gold and silver have been $3,787,564 28. Total coinage, $4,184,-497 37. Numbers of pieces, 49,108,402.

At the Branch Mint, San Francisco, the gold deposits were $17,936,014 26; gold coined, $17,510,-960; silver deposits and purchases, $962,879 95; silver coined, $815,875; silver bars, $224,763 68. Total coinage of gold and silver, $18,551,598 68; number of pieces, 2,872,173.

The Assay Office in New York received during the year $1,812,106 60 in gold bullion; and in silver, $325,536 22. Fine gold bars stamped at that office, 1,488; value, $1,793,838 16; silver bars, 1,916; value, $158,542 91; total value of gold and silver bullion $264,137 82.

The branch mint established at Denver, Colorado, Territory, was not opened until the close of last September. Its operations are, for the present, confined to melting, refining, assaying and stamping bullion, which is returned to the depositor bearing the Government stamp of weight and fineness. Idaho is now yielding large quantities of very fine gold; and the gold workings in Oregon and Washington Territory are on the increase. Arizona is yielding both gold and silver and the natural supplies are unlimited.

Up to the close of the present fiscal year there have been 164,011,000 nickle cents coined; and the profits arising from these have paid all the expenses of coinage and distribution. It is recommended (in the Report) that the use of such a valuable metal as nickel may be dispensed with, and its place supplied by tin and zinc. The Report states that all of the silver which has gone into the three, five, and perhaps ten cent pieces, might have been reserved for larger coin, and the circulating value of these pieces have not been lessened thereby. Aluminum can be advantageously substituted for silver in small change, and thereby supplant the present postal currency. The Report urges that the mottoes upon our coinage should be "expressive of a national reliance upon divine protection, and a distinct and unequivocal national recognition of the divine sovereignty."

COMPOSITION OF THE ATMOSPHERE---VALLEY OF DEATH.

The atmosphere that we breathe in its ordinary healthy condition is composed of the following constituents:—Oxygen, 20·61 per cent.; nitrogen, 77·95 per cent.; carbonic acid, ·04 per cent.; watery vapor, 1·40 per cent. Now, the oxygen is the important ingredient which supports life, the nitrogen being only a diluter of the oxygen; the carbonic acid gas is in scarcely appreciable quantity, and that is produced by the process of respiration and combustion on the surface of the earth, by which immense quantities are continually being formed; nevertheless, the proportionate quantity scarcely varies, for this very gas, which is exceedingly destructive to animal life, is, as all know, the principal food upon which the vegetable world lives, absorbing this carbonic acid from the air, and decomposing it, retaining its carbon and giving off the oxygen, which is just what animals require. The destructive agency of this gas—viz: carbonic acid—on animal life is well exemplified in certain places where large quantities are evolved from the earth, the most striking instance being the celebrated valley of Java, which, if any animal enters, he never leaves. The following is an interesting account of this valley, given by an eye-witness:—

We took with us two dogs and some fowls to try experiments in this poisonous hollow. On arriving at the foot of the mountain we dismounted and scrambled up the side, about a quarter of a mile, holding on by the branches of trees. When within a few yards of the valley we experienced a strong, nauseous, suffocating smell, but on coming close to its edge this disagreeable odor left us. The valley appeared to be about half a mile in circumference, oval, and the depth from thirty to thirty-five feet; the bottom quite flat; no vegetation; strewed with some very large (apparently) river stones, and the whole covered with skeletons of human beings, tigers, pigs, deer, peacocks, and all sorts of birds. We could not perceive any vapor or any opening in the ground, which last appeared to us to be of a hard sandy substance. It was now proposed by one of the party to enter the valley, but at the spot where we were this was difficult, at least for me, as one false step would have brought us to eternity, seeing no assistance could be given. We lighted our cigars, and, with the assistance of a bamboo, we went down within eighteen feet of the bottom. Here we did not experience any difficulty in breathing, but an offensive nauseous smell annoyed us. We now fastened a dog to the end of a bamboo eighteen feet long, and sent him in. We had our watches in our hands, and in fourteen seconds he fell on his back, did not move his limbs or look round, but continued to breathe eighteen minutes. We then sent in another, or rather he got loose, and walked into where the other dog was lying. He then stood quite still, and in ten minutes fell on his face, and never afterwards moved his limbs; he continued to breathe seven minutes. We now tried a fowl, which died in a minute and a half. We threw in another, which died before touching the ground. During these experiments we experienced a heavy shower of rain; but we were so interested by the awful sight before us that we did not care for getting wet. On the opposite side, near a large stone, was the skeleton of a human being, who must have perished on his back, with his right hand under his head. From being exposed to the weather, the bones were bleached as white as ivory. I was anxious to procure this skeleton, but an attempt to get it would have been madness.

BOILING FOOD FOR HOGS.

At a recent meeting of the Farmers' Club, Prof. Mapes made the following remarks in regard to boiling food for hogs:—"The proof of the saving of food by boiling has been given here, and, as it can be stated in very few words, we may as well have it. Mr. Mason was a watchmaker in Camden, N, J., and among other fancies he liked to keep hogs. He has his hog pen just back of his shop, so that he could sit at his window and watch his hogs. Every spring he bought some pigs and fed them through the season. Just opposite to Mr. Mason was the store of Mr. Van Arsdale, and every pound of food that Mr. Mason gave to his pigs he bought at this store. At the end of six months he got his bill from Mr. Van Arsdale, and he always slaughtered his hogs at that time, so that he knew exactly how much his pork cost. For several years it figured up about 13 cents per pound. At length some one advised him to boil his corn. He accordingly got a large kettle and cooked all the food which he fed to his pigs. Then his pork cost him 4¼ cents per pound! We also had the experience of Mr. Campbell, which was about the same as Mr. Mason's. Henry Elsworth made some extensive experiments in the same thing, and his statement is that 30 pounds of raw corn make as much pork as 13 pounds of boiled corn."

FOOD FOR CATTLE.

The high price of fresh butcher meat in our cities, should induce many farmers living near such large markets to devote more attention to the raising of sheep and cattle. It is not the province of every farm to produce this fatted meat. Some farms are, to all intents and purposes, breeding farms; others are fatting farms; but both are engaged in their respective ways to provide for the public wants—the public larder. To keep up a successional supply of nutritious food on every farm is no easy task. Throughout the summer, autumn, and winter, the difficulty is not great. The grass pastures and grazing seeds make ample provision for the stock during the summer and autumn, and the root crops for the winter. It is only in the early spring months and autumn that any difficulty arises, *i. e.* the interim between roots and grass and grass and roots. Now to provide against this uncertainty there are several common matters of business to be adopted and attended to. The culture of cabbage, carrots and turnips should be adopted for feed, and given as such till near midsummer. In average seasons a supply of cabbage of one variety or other may, with care and judgment, be maintained throughout the whole year. The large Drumhead cabbage and early varieties would form the great feature in cabbage culture, and if the cabbage was carefully cut and carried to the animals, the stalks on putting out new shoots would yield a fresh supply in early spring.

FOREIGN SCIENTIFIC MISCELLANY.

It is easy enough to condense steam, and to burn the visible particles of carbon which we term smoke—the latter operation can indeed always be carried out by a skillful fireman; but the gaseous products of combustion have never been completely consumed in any instance that we know of. It is therefore thought that, in the underground railroad in London, air may yet be used for propelling the trains, similar to that used by the Pneumatic Dispatch Company. The use of air for such purposes is a subject worthy of patient investigation.

There is a project on foot to establish a street railway in Dublin. The line is designed to be carried on an ornamental viaduct, the arches of which are to be made available as warehouses. In a wide street like Sackville street, Dubli , such a plan is practicable; but in Broadway it could not be carried out without doing immense damage to property. This scheme exploded here some years ago.

In the year 1863 there were 1404 fires in the city of London, only 39 of which resulted in the total destruction of the buildings. For the whole number of fires there are 112 alleged different causes: 227 originated from candles, 117 from flues, 26 from matches, 107 from sparks, 100 from gas, 24 from hot ashes, 31 from smoking tobacco, 41 from airing linen, 39 from children playing with fire and matches. During the same year there were 361 fires in New York and 300 in Paris.

The great Mont Cenis tunnel through the Alpine Pass is making slow but steady progress. Boring machines were set to work in 1861. During the past year cutting was done at the rate of 4 feet 5 inches per day, so that at the present rate of working it will require nearly 15 years to complete the job! The rock in which the excavation is at present being made is exceedingly difficult to work, having what the engineers have termed an "infelicitous stratification."

The *Great Eastern* is advertised for sale by order of the mortgagees. She is 680 feet long, 82 feet in breadth, and 57 feet deep. She can accommodate 1,586 passengers, and stows 10,000 tuns of coal. Her engines have an effective horse-power of 8,000 horses. She has also fresh-water condensers capable of supplying 4,000 gallons per day. She is a splendid specimen of naval architecture, though an unfortunate speculation to her projectors. This vessel was recently put up at auction in England, but only £50,000 being offered, she was bid in by her present owners.

When all the bridges across the Thames at London are complete they will form a sight unrivalled in the world for magnificence. Two splendid new bridges are now in course of construction, one of which is designed to accommodate four lines of rails, with side ways for passenger traffic. Within the limits of London we believe there are now seven fine bridges and one tunnel. The shipping of the Thames is all "below" the old London Bridge.

The incline of the Bohore Ghaut range, recently completed, is one of the most remarkable achievements of railway engineering in East India. The incline is nearly 16 miles long, with a total rise of 1831 feet, the two steepest gradients being 1 in 37 feet, and 1 in 40. It includes 25 tunnels and 8 viaducts, with 1,250,000 cubic yards of embankment, and has occupied seven years in construction.

Glass bushes or steps are being used for bearings for shafts, to some extent, in England; the glass being protected at the ends by metal flanges attached to the pedestals with papier maché or india-rubber interposed.

Nuts that do not set squarely on their bottoms soon strip the threads off the bolts.

Improved Corn or Seed Planter.

The labor and time occupied in seeding ground is well known by practical persons to be very great; and since the introduction of machinery to perform this duty it has been much facilitated. The engravings published herewith represent a new corn-planter, for which a patent is now pending through the Scientific American Patent Agency.

The plan of the machine consists in providing a rectangular frame, A, with a second one, B, mounted on wheels and secured by hinged joints to the first one mentioned. In A the seed boxes, C, are placed, as also the automatic arrangement for opening and closing the apertures in the bottom of the seed hoppers, through which the grain falls into the track made by the drills, D. The seed-distributing machinery consists of an iron shaft, E, working in bearings, and having two vertical arms which are connected to a vibrating slide (see Fig. 2), F, in the bottom of the seed box. The shaft has also a horizontal arm, G, which is driven by two or more pins, H, placed at equal distances in the rim of the wheel. It will be seen that by this arrangement the pin strikes against the arm and depresses it, and in so doing moves the slide, F, to one side, so that the corn or other grain falls out. After the pin passes over the lever the same is restored to its position by a small spring, I, on the under side. When the driver has traversed the whole field and wishes to retrace his ground in order to plant a second row in line with the first, the machine is turned about and brought into the proper place; at this time the lever behind the driver's seat is brought into requisition. In order to make the planting begin at the proper time the pins must strike the lever at a certain point; to do this the driver raises the lever, J, which throws the T-headed bar, K, down on the ground and raises the wheels clear; they are then to be turned by hand until the pins are in the proper position to commence work. By the arrangement of these several parts a convenient and simple machine for planting grain of any kind, and at all distances apart, is secured.

Fig. 1.

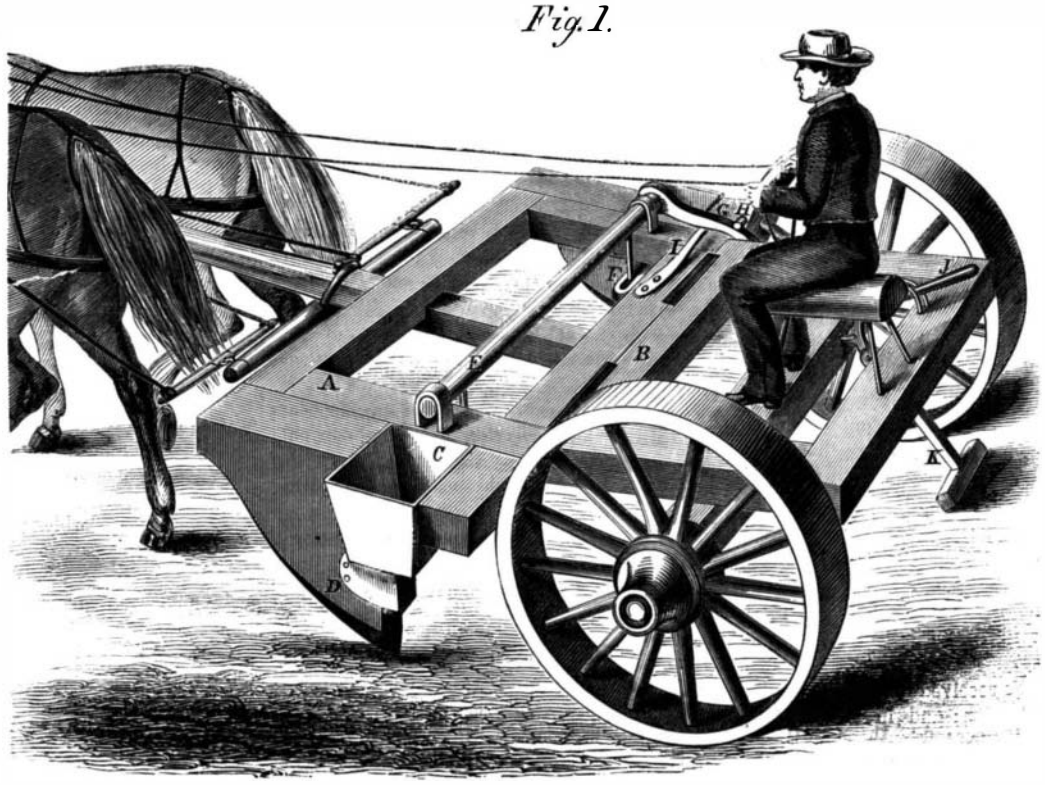
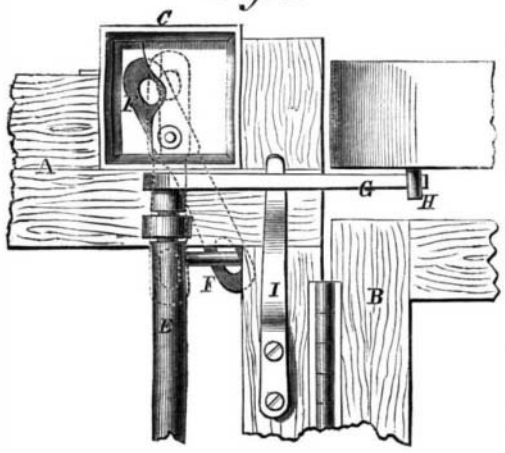


Fig. 2



For further information address the inventor, James McKell, at Burlington, Iowa.

M'KELL'S CORN OR SEED PLANTER.

We learn from a foreign contemporary that the 9-inch cast-steel gun of Krupp has pierced two 4½-inch iron plates bolted together. One of the guns burst at the 69th round. The weight of the projectile, as also the range and charge of powder, is not stated.

AMERICAN CAST-IRON ORDNANCE.

The appended letter (cut from the Philadelphia *North American*) contains some interesting information concerning the progress our founders are making in the matter of combining iron ores, so as to produce the greatest possible tensile strength. The name of a Reading firm appears rather too prominently, but for the sake of the information we are glad to reprint the article:—

"The manufacture of heavy ordnance for the army and navy of the United States, recently commenced on a somewhat extensive scale in this city, has been attended with such favorable and extraordinary results, and is so likely to be associated hereafter with the most important manufacturing interests of the commonwealth, that I am induced to forward you for publication some of the main facts and features of the enterprise. For these facts I am indebted to a very intelligent gentleman who has for some time been connected officially with the deputation sent here by the Army Bureau to conduct the experimental tests of the strength of the ordnance produced, and I deem them of such importance as that a record should be made of them for the information not only of our own people, but for whatever satisfaction may be deduced therefrom by those of foreign nations, whether friend or foe.

The first trial of the iron of this county for ordnance was made in 1861, under an informal contract between the Chief of the Naval Ordnance Bureau and the firm of Seyfert, McManus & Co. As they had not, at that time, completed their arrangements for the regular manufacture of cannons, they sent the metallic material to Philadelphia, where a 9-inch gun was cast and sent to Washington, to undergo the usual proof-tests to which all classes of ordnance are subjected. This gun was tried 600 rounds with a service charge of 10 pounds of powder, and with shells weighing 69 pounds. The charge was then increased to 12½ pounds of powder, and a corresponding increase of the weight of solid shot, with 500 additional rounds. This series of discharges was made with great rapidity, with a view of imposing an additional test of capacity—reaching as high as 196 rounds per day. The experiment was so entirely successful and satisfactory that Admiral Dahlgren, in his report, mentions the gun as one of extraordinary excellence.

"In the meantime, Messrs. Seyfert, McManus & Co., were erecting the necessary machinery for the regular manufacture of similar guns at their own foundry; and contracts for fifty 9-inch and fifty 11-inch guns were subsequently obtained, and the cannon manufacture was thus, for the first time, regularly commenced in this city.

"As guns of all classes and caliber are required to be tested, it is the practice to select one which combines certain fixed data of density, tensile strength, &c., and subject it to what is termed extreme proof. It is assumed that all other guns made of the same iron, and under circumstances precisely similar, will exhibit the same peculiar strength and qualities; and this rule holds good so far in experience that deviations from it are extremely rare and exceptional. In accordance with this rule an 11-inch gun was selected, and under the supervision of the authorized agents of the Navy Department, was subject to the same ordeal, with the following extraordinary results. One thousand (1,000) rounds were fired, with service charges of 15 pounds of powder and shell weighing 132 pounds. Subsequently the charges were increased to 25 pounds, and solid shot weighing 164 pounds, and the gun withstood the enormous pressure of 127 rounds, when it burst. This was a test which would never have been required or attempted in actual service, and probably has but few, if any, parallels in the history of cannon.

The famous attack of the rebel iron-clad *Merrimac*, and the destruction of our wooden naval vessels, and her subsequent defeat by the first monitor, initiated an entire revolution in naval combats. Iron-clad vessels, propelled by steam, and carrying two or three guns, of very heavy caliber, have since taken the place of our wooden (armed) sailing vessels, with their broadside bottoms. To meet the exigencies of this radical change in the armament of our navy, the Bureau of Ordnance gave orders for three thirteen-inch guns to be made; one at Providence, R. I., one at Pittsburgh, and one at Reading. These guns were of the same size, weight and dimensions, made in accordance to diagrams and instructions from the Naval Bureau, excepting that of Providence, which was cast solid, while the other two were cast upon the plan of Major Rodman, U. S. A.—that is hollow, or on a core, as it is termed. When finished, however, the guns were required to conform to the size and dimensions specified in the diagrams of the Bureau, so that in that respect no difference existed between them. The length of the guns, as finished, was from cascabel to muzzle, 13 feet 6 inches; diameter at breech, 3 feet 9 inches; at muzzle, 2 feet 4 inches; caliber, 13 inches; length of box, 10 feet 10 inches; estimated weight, 37,000 pounds.

"Now, let us witness their qualities. The Providence gun was tested in that city by an experienced ordnance officer. Commencing with a charge of thirty pounds of powder and 280 pounds of solid shot, ten rounds were fired. With forty pounds of powder and same shot, ten rounds more; with fifty pounds of powder, and shot same as before, 158 rounds more—finally bursting on the one hundred and seventy-eighthround. (Illustrated on page 324, Vol. IX. of the Scientific American.) The greatest enlargement after the first ten rounds was the 89-1000ths of an inch; after ten rounds, 127-1000ths of an inch; after the one hundred and seventieth round, 150-1000ths of an inch.

"The Pittsburg gun was sent to Washington, and no authentic details of its proof have been received; but it is sufficient to state that, while undergoing trial, the bore became so terribly scored by the abrasion of the balls that it was considered unsafe to prosecute the experiments within the limits of the navy-yard, and it was consequently removed to some point down the river, where it burst into fragments at the one hundred and fiftieth round, or thereabouts.

"The Reading gun was proved near this city, un-