due to imperfection in its preparation, and ceases altogether when suitable processes are adopted in its manufacture. Perfect gun-cotton is a definite chemical compound; and certain processes for the removal of all extraneous matter and of every trace of free acid are absolutely indispensable. But, when thus prepared, it appears to be no longer liable to spontaneous combustion; it can be transported from place to place with perfect security, or be stored for any length of time without danger of deterioration. It is not impaired by damp; and may be submerged without injury, its original qualities returning unchanged on being dried in the open air and in ordinary temperature.

"A scarcely less important point towards the utilization of gun-cotton, and the safety with which it may be employed in gunnery, is the power of modifying and regulating its explosive energy at pleasure, by means of variations in the mechanical structure of the cartridge, and in the relative size of the chamber in which it is fired.

"The experiments made by the Austrian Artillery Commission, as well as those for blasting and mining, were conducted on a very large scale; with small-arms the trials appear to have been comparatively few.

"There can be no hesitation in assenting to and accepting the concluding sentence of the Committee's report:—'The subject has neither chemically or mechanically received that thorough investigation that it deserves. There remain many exact measures still to be made, and many important data to be obtained. The phenomena attending the explosion of both gun-cotton and gun-powder have to be investigated, both as to the temperature generated in the act of explosion, and the nature of the compounds which result from them under circumstances strictly analagous to those which occur in artillery practice.'"

NEW BOOKS AND PUBLICATIONS.

THOMAS, ON RIFLED ORDNANCE—Illustrated. D. L. Van Nostrand, publisher, 192 Broadway, New York.

In the present dearth of really good and popular text-books on the science of gunnery in general, and rifled ordnance in particular, the volume before us is one which will be eagerly sought for by those who seek to be well informed upon the subjects mentioned. The author is Mr. Lynall Thomas, F. R. S. L., an English inventor of some note, who has not contented himself with merely theorizing on the subject, but has demonstrated his arguments by practical tests against other weapons. Apart from the merit of the work in this respect, the manner in which the author expresses himself is worthy of the highest praise. Even to the professional individual, the study of machinery, or of theories connected with it, requires the closest mental application to master their intricacies, but when the labor is added to by the obscure phraseology, ungrammatical phrases, and defective technology of the writer, the task becomes too wearisome to be prosecuted, and many an ingenious theory and practical plan is thrown aside solely because the author has presented it in so forbidding a manner. No such fatal defects mar this work, and so happy is the style throughout that even those who have litttle or no knowledge of rifled ordnance cannot fail to acquire much valuable information by a perusal of the work under discussion. A brief synopsis of the table of contents shows the following interesting articles:—"On Rifled Cannon," comprising 9 pages; "On the Turn of the Riffing," 14 pages; "Influence of the Caliber on the Turn," with illustrations, 37 pages; also the form of the grooves, flight of projectiles and a new theory on the action of fired gunpowder. We have derived much valuable information from a hasty perusal of the work and shall return to it with pleasure as an opportunity affords. The mechanical execution of the work is good, and it is one which might adorn any parlor table. Price $2.

DANA'S ELEMENTARY GEOLOGY. By James D. Dana, LL.D., Professor of Geology in Yale College. Published by Theodore Bliss & Co., Philadelphia.

This is the title of a new "Text Book of Geology," designed for schools and academies. It is illustrated with three hundred and seventy-five cuts, is of a convenient size, and is well printed on good paper. In this work geology is treated as a history of the geographical changes of the globe, or those of its continents and seas, through successive ages, and a history of the progress of life from the earliest species up to man. The illustrations given of the science of geology are mainly drawn from American rocks; and it is truly a geological history of the American continent. It is a clear and able production, such as we would have expected from its eminent author. It will supply a want long felt in our high schools and academies.

MANUAL OF ELEMENTARY PROBLEMS IN LINEAR PERSPECTIVE. By P. Edward Warren, C. E., Professor of Scientific Geometry, &c., at the Rensselaer Polytechnic Institute. Published by John Wiley, 535 Broadway, New York.

Drawing is a science and an art; therefore to acquire a correct knowledge of it, the principles upon which it is based must be thoroughly understood. In this little volume of Professor Warren's, the principles of the art are very clearly illustrated and explained. It is divided into two parts, consisting of "primitive methods" and "derivative methods." A practical knowledge of the art of drawing is indispensible to architects, engineers and mechanics; and it is useful to all who are engaged in any of the arts requiring graphical representation or design. The author of this volume is a most competent person for the production of such a useful work.

THE ATLANTIC MONTHLY. Ticknor & Fields, Boston, Mass.

The ever welcome *Atlantic* comes to us regularly with its honest brown face and table of contents full to overflowing of interesting essays, tales, poetry, &c. The poetry of the *Atlantic Monthly* is uniformly of a high character: but the essays, though doubtless clear, are sometimes a little drawn out and (must we say it?) rather heavy. An article on "Genius," the leading one in the number for February, though exceedingly readable, covers 19 mortal pages, which is space enough, one would think, to exhaust the subject in. A tribute to the poet Bryant is in excellent taste; and this, in connection with the "House and Home" papers of Mrs. Stowe, is alone sufficient to render the number an interesting one. In addition, Agassiz contributes an article on the "Glacial Period," and there are a number of other miscellaneous articles which will be found interesting to the general reader. The *Atlantic* is for sale by all periodical dealers.

APPLETON'S POSTAL GUIDE. D. Appleton & Co., 443 Broadway.

We have received a copy of "Appleton's Postal Guide" from the publishers, which is published quarterly, carefully corrected and revised. We have had occasion to consult previous issues of this work and have found it an invaluable assistant in correcting the omissions of careless correspondents who have omitted their place of residence or the State and County they reside in. The guide contains a complete list of all the post-offices in the country, and is an authorized medium of information between the Post-Office Department and the public. Price, $1 per annum.

"THE PHILADELPHIA PHOTOGRAPHER."—This is the title of a new publication of which the first number is now before us, and a splendid specimen of the typographical art it is. A most beautiful photograph of the painting, "The Loan of a Bite," also accompanies it. The Philadelphia *Photographer* is a monthly work, at $3 a year. Each number is to be adorned with a photographic picture, worth of itself the price of the monthly part. The contents are of an interesting nature, and to all photographers will be useful and valuable; for they are evidently the productions of clear-headed, practical men. Our new cotemporary promises to be a valuable acquisition to the cause of progressive science; and we hail its appearance with pleasure. We wish for it the highest success. Benerman & Wilson, publishers, Philadelphia; Anthony, New York.

LATHES that do not bore straight holes can easily be altered without reboring the boxes the spindle runs in. Take a piece of tin, or metal of any thickness, and place it between the V of the shears and that in the head-stock of the lathe; this will throw the spindle in line with the shears again, so that it will bore parallel. Of course, the lining must be placed on the opposite side of the head-stock that is "out" of line, so as to bring it back, This is a quick and certain method of making a lathe bore a straight hole.

PRODUCTION AND CONSUMPTION OF COFFEE.

The two principal sources from which Europe is supplied with coffee are Java and the Brazils. The total annual production of coffee in the world may be estimated in round numbers at six millions of cwts., of which Europe alone consumes four and a half millions, or three-quarters of the whole quantity produced. It appears that, comparatively speaking, the greatest consumption is in little Switzerland, where it amounts annually to 12 lbs. per head of the whole population; that Holland, with its two and a half millions of inhabitants, drinks as much coffee as the thirty-six millions in France; that Belgium and Holland consume nearly 10 lbs. per head; that the Zollverein and Germany consume 4 lbs. per head, and the other countries only about 1 lb. per head. In Great Britain the consumption of coffee in 1862 was 309,500 cwts., which is equal to 1 lb. and eighteen-hundredths of a pound per head, taking the population at 29,193,397—the result of the census of 1861. In most parts of Europe the consumption of coffee has been rapidly increasing during the last few years, whilst almost everywhere it is capable of still greater extension, especially in the colder and more northern climates. On the other hand, it is demonstrated by statistics that the great wine-producing countries of Europe—Spain, Portugal, Italy, and Greece—consume comparatively but little coffee; and no doubt that France might be classified among these latter, were it not that the coldness of the climate of one-third of that empire—say from the latitude of Paris to the British Channel—prevents the grapes from ripening in that zone, and therefore opens the door for a larger consumption of coffee.

In Java the production of this berry has been at a stand-still for several years, as the Dutch Government finds it more profitable to increase the cultivation of sugar. Central America has for some time past been torn by dissensions and civil war, so that the inhabitants have neither time nor confidence enough in the future to turn their attention to the extension of their coffee plantations, which, unlike sugar, rice, and cotton, require several years before they attain maturity and bear crops. The other countries producing coffee are mostly islands, and having but a certain limited area, there is not much room for planting more coffee-trees.

The Brazils alone seem capable of growing coffee to an unlimited amount from the vast extent of their thinly populated territory; but, from various causes, they remain stationary, and, from a defalcation of their crops during the last two years in succession, the exports from that empire have even been considerably less than in previous ones. This failure of the crops is partly owing to climatic influences of an unfavorable nature, and partly to a disease that attacks the coffee-trees in certain localities, much in the same way as the vines are affected by the ravages of the oidium. It must also not be overlooked that the price of labor has of late risen to an enormous and unprecedented hight in the Brazils, in consequence of a want of sufficient influx of population, owing to the suppression of the slave-trade as a legal branch of commerce, and the increased difficulty, risk, and expense of smuggling in fresh supplies from Africa; so that the present high prices of coffee bring to the planters a less advantageous return than did formerly lower prices combined with the payment of less wages for labor. Whilst it was previously the invariable custom to under-estimate the crops in order to keep up the prices of coffee in the European markets, the very reverse is at present the case, as is illustrated by the crop of 1862–1863, which now turns out to be considerably less than the original estimate. The reason for this alteration of tactics may be accounted for by the fact that among the Brazilian coffee-planters there are many possessed of but very limited capital, who endeavor to keep up their credit by exaggerating the produce of their crops, by which they are enabled to obtain larger advances from the merchants to carry on their operations. In former years of peace and commercial prosperity, the United States used to import from the Brazils alone no less than a million and a quarter of bags of coffee annually; whereas, since the commencement of their unhappy dissensions, their imports from the same quarter have been reduced to 350,000 bags. As soon as the war is brought to a close, as it must sooner or later, there can be no doubt but that the Americans will again

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.