

# Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

O. D. MUNN, S. H. WALES, A. E. BEACH.

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

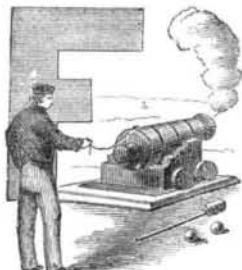
Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada. Sampson, Low, Son & Co., the American Bookellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

See Prospectus on last page. No Traveling Agents employed.

VOL. II., No. 15.....[NEW SERIES.]...Fifteenth Year.

NEW YORK, SATURDAY, APRIL 7, 1860.

## GREAT GUNS.



FROM Europe there come notes of approaching war, and on our side of the water "the front of battle lowers" between the United States and Mexico. As a consequence of "smelling the battle from afar," there is considerable activity among inventors to furnish the most perfect and formidable engines of destruction; their attention has been intensely concentrated on this object, and breech-loading rifled cannon seem to be the objects of their special devotion. There can be no doubt that an army furnished with superior artillery has a vast advantage over another of equal numbers and in all other respects as well equipped. It is no wonder, therefore, that efforts are now making by all fighting countries to invent the best cannon. We have now before us a pamphlet by J. Webster Cochran, of this city, describing an improved cannon and projectiles, which are claimed to be very superior; and experiments have proved them to be of great value and importance. In Europe, the rifled cannon of the Emperor Louis Napoleon, of Sir William Armstrong, and of Mr. Joseph Whitworth are said to possess great range and accuracy, but their durability is held to be very limited; they are liable to burst, owing to the great pressure of the ignited charge in the chamber. The effect of successive discharges upon such guns is like concussions upon a locomotive without springs; such an engine would break down during the first trip. The Cochran (American) gun has a screw breech, and is provided with a plunger behind the charge chamber, and behind this there is a powerful volute spring which acts the part of an elastic cushion. There is also a light charge exploded in the chamber before the main one is ignited, so that the shot is started easily, and, when started, it receives the full force of the expansion. The pressure which the powder exerts when ignited—and before the shot moves—to burst the gun, is thus directed more immediately to propel the shot forward; and very perfect combustion of the powder is also effected, which greatly increases the range.

The Armstrong gun which is now being manufactured by the British government, is a breech-loading rifle of peculiar construction. Instead of being made of cast iron it is formed of wrought iron, in three separate hollow coils welded upon the top of one another, to constitute the barrel. Its breech end is open and has an inside screw thread cut upon it; behind this is a large hollow screw, through which the shot is introduced into the chamber, and just in front of this is a large vertical wedge or plug which forms the butt of the charge chamber. This wedge is drawn out when the gun is to be loaded; then when the shot is passed through the hollow screw, the butt is forced down behind it, and the screw turned with a lever which wedges the plug close behind the charge. This butt or breech-piece is faced with copper and is very strong. The grooves of this famous gun are angular, 40 in number, and very fine. Their pitch is  $10\frac{1}{2}$  feet, consequently the shot makes a revolution in that distance. These guns are fabricated from the finest bars of wrought iron, and are forged upon the same principle as the "stub and twist" barrels of fowling-pieces. Their range and accuracy are great, in comparison with the old smooth bores of cast iron; and 3,000 of them are to be finished this year.

A formidable competitor to the Armstrong gun has lately been tried by its inventor, Mr. Whitworth, the famous tool-maker in Manchester, who was appointed one of the commissioners to the American Crystal Palace Exhibition held in 1853. His cannon are said to surpass all those that have yet been tried in England, either for range, accuracy, or durability. The bore of his guns is hexagonal, with rounded spiral grooves of a very short pitch. The interior of the barrel is composed of rifling surfaces entirely, not a set of spiral grooves and non-effective lands, as in common rifles. On the 16th of February, quite a number of experiments were made with three of Whitworth's cannon, at Southport (England), in the presence of many military and naval officers. A 3-pounder, weighing 208 lbs., length 6 feet, bore  $1\frac{1}{2}$  inches, and pitch 3 feet 4 inches surpassed any cannon we ever heard of for range. With a charge of 8 ounces of powder, and an elevation of  $35^\circ$ , it carried to a distance of 9,688 yards—about  $5\frac{1}{2}$  miles—and it ranged very straight. An 80-pounder, with a 12-pound charge, elevated at  $10^\circ$ , carried 4,730 yards, with a deviation of only 6 yards. The London Times and the Mechanics' Magazine are in raptures over the performances of the Whitworth cannon. With the 3-pounder, pickets of cavalry may be "picked off" at a distance of six miles as easily as larks at 30 yards. They consider that "Old England" is now safe from the machinations and ambition of the ruler of France. Roast beef and plum pudding are safe; London porter will keep quiet as usual, and Uncle John may sleep secure in his "red nightcap," without dreaming of thunder. The Whitworth cannon is made of homogeneous cast iron. The breech consists of a cap with a double screw, and it is screwed off and on with two turns to load and discharge. No lead band is required on the shot; they are made to fit the grooves without expanding. The 3-pounder has been fired 3,000 times and exhibits no sign of wear; it is, therefore, "a great gun."

When we hear such thundering of cannon coming across the Atlantic, we ask the modest question: "What is our government doing to improve our artillery?" Here is Cochran's effective breech-loading rifled gun at our own door; and yet our arsenals and dockyards have only "old foggy" cast iron smooth-bored guns. These were good enough in the days when Santa Anna's wooden leg flourished against us on the field; but they are behind the present age. They should be melted down and converted into homogeneous, native breech-loading rifles, or rifled guns of any sort, rather than be behind the "great guns" of other navies and armies.

## PATENT EXTENSIONS—CURIOUS PARAGRAPH—COMMISSIONER THOMAS.

The Morse patent machine, for telegraph operation, will soon come up for an extension of five or seven years. It will meet with strong opposition from several parties. The principal of patent extension is adverse to the policy of the government in that department.

We find the above paragraph among the items of news in a recent Washington letter to one of the daily papers of this city. It is easy enough to understand the first two sentences, but it would puzzle a Philadelphia lawyer to unravel the mystery which envelops the last one. We can only conjecture that the writer means to say that the principal of the Patent Office, who is no other than the Hon. Philip F. Thomas, is opposed to the extension of patents. We could not have ciphered out such an inference, even from the above paragraph, but for a statement which has been made in our hearing, to the effect that Mr. Thomas was understood to be constitutionally opposed to the extension of patents, regarding them in the light of oppressive monopolies. We do not believe that this is true, although we have had no opportunity to test the truth or falsity of the matter. He cannot, however, remain long in his present position without settling, in a definite manner, his constitutional views on this subject. Probably the most delicate and responsible of all the duties of the Commissioner of Patents is to decide upon the interests of patentees in extension cases; and no man would be fit to hold that office for a single day who carried in his breast a prejudice against their rights and interests, which are too vast and too important to be adjudicated upon, except by one who can bring to their consideration an unbiassed judgment. If there is to be any constitutional prejudice in the matter, it ought to lean rather towards the inventor; for, certainly, his lot is a sufficiently hard one, as a general rule, without

encountering at the doors of the Patent Office a spirit of even partial hostility. We do not write thus because we cherish the belief that the rumor concerning Mr. Thomas is well founded. We believe it is not; but his acts will speak his mind better than the mere gossip of newspaper writers.

When Commissioner Mason found the Patent Office little else than "noise and confusion," and exceedingly unpopular with inventors in all parts of the country, he became to them a sort of *pater familias*, and soon restored the office to credit and usefulness. His successors followed in his footsteps, and we trust the lessor will not be unheeded by the new Commissioner, all rumors to the contrary notwithstanding.

## AGRICULTURAL SCIENCE—TOP DRESSINGS—BLANCHING VEGETABLES.

Now is the season for the application of "top dressings" for pasture, meadow and other lands. The best substances for this purpose afford matter worthy of attention, and yet it is difficult to give any but general advice, as the nature of the soil must always be taken into consideration in providing suitable fertilizers. Gypsum (common plaster) is very extensively employed for top dressings; but many farmers question its advantages except for clover. Gypsum is composed of about equal parts of lime, water and sulphuric acid. It is a mineral which is found in the tertiary formation above the chalk and it is also an accompanying bed of the new red sandstone which covers the coal measures. On pasture land it produces good effects when applied on the clover as it is springing up in early Spring. Air-slacked lime has been of considerable benefit in some particular situations, when thinly sowed upon pasture lands. It has produced good effects on grass where there has been considerable sorrel and moss, by making fine grass spring up in the place of these. It is very good for coarse, thin pastures, situated on high grounds, but it is best to apply it mixed with half its weight of clay. In western Pennsylvania, Ohio, and all places where bituminous coal is employed for fuel, its soot is excellent for a top dressing for gardens and all lands. It contains some traces of potash ammoniacal salts and pungent coal oil. It is an excellent manure, and imparts a most healthy color to young plants, such as onions, and all kinds of grains and grasses. It never fails to invigorate young grain when applied in the Spring. It is, perhaps, the quickest and most powerful top dressing that can be used. About 40 bushels sown upon an acre of clover will about double the crop. The white fine ashes of coal contain considerable stimulants for grass as a top dressing. These consist of some lime, magnesia, aluminous earths and traces of potash. Applied to old pasture lands as a top dressing, at the rate of about 60 bushels to the acre, in April, it is very beneficial. It tends to destroy sorrel, rushes and mosses. As a compost of clay and lime is accessible to almost every farmer, its application is greatly to be recommended. It is a very durable top dressing for grass lands, and it also benefits almost any soil to which it may be applied. About 15 bushels of lime is a very good quantity to the acre, but 20 bushels may be safely used.

Vegetable gardeners blanch certain vegetables and make them very tender and palatable, while otherwise they would be hard and fibrous. This is done by excluding the light by burying them in the earth. A very subtle and intricate, but beautiful branch of science comes in here as an explanation of this phenomena.

The researches of Hunt, on the effects of light upon vegetation, have established the fact that the blue or actinic rays produce purely chemical changes; they promote the germination of the seed, but do not enable the plant to decompose carbonic acid. Very accurate experiments have proved that the growth of a plant is proportionate to the illuminating power of the solar rays. Hence those plants exposed to the action of yellow light grow more rapidly than under the influence of red or blue, because of the greater illuminating power of the yellow rays. Professor Draper, of this city, exposed leaves and grass, in tubes containing water saturated with carbonic acid, to the influence of the different rays of the sun, which were separated from each other by means of a glass prism. On examining the contents of the tubes after exposure for a sufficient period, it was found that the quantity of carbonic acid decomposed in the tube which had been placed in the yellow light was nearly double that decomposed in the tube which was

exposed to the red rays, and nine times greater than that decomposed in the blue light.

When plants are put into a dark place their colored parts become blanched, the green coloring matter is oxygenated and decomposed, the tissues become weak and distended by the quantity of matter which has been mechanically absorbed and which they are not able to give off by exhalation, and the plants actually die of starvation whilst surrounded by abundance of suitable nutriment; the stimulus of light, by which alone that nutriment could be appropriated, being wanting.

The green coloring matter of plants is called *chlorophyll*, and gardeners know that it cannot be formed without light. They take advantage of this in modifying the color of vegetables for the table by planting them in situations where the light is very limited, and the result is a change of their color and taste. By covering the lower portions of celery and some other plants, they are rendered tender and white; this is due to the exclusion of light, which is the great developing agent of the woody matter. Potatoes planted near the surface of the ground are always stringy and harsh; those who advocate very shallow planting do not know what they are talking about. The calorific rays which are absorbed by plants are retained in them, ready to be given out in the form of heat when burned as fuel.

#### INTERESTING PROCEEDINGS IN CONGRESS. THE NEW PATENT BILL.

We notice, by recent proceedings in the Senate, that, on motion of Senator Bigler, chairman of the Senate Committee on Patents, the patent bill published on page 146 of the present volume of the *SCIENTIFIC AMERICAN* was made the special order for Wednesday of this week. There is, therefore, at the time of our going to press, a prospect that this important subject will be no longer permitted to sleep in the dusty pigeon-holes of the committee room. We hope, also, that when the subject is discussed, the Senators will show a proper appreciation of the rights and interests of a useful class of our citizens, whose claims upon the consideration of Congress have been heartily ignored for nearly a quarter of a century. The bill, as re-printed by the committee, is crude and ill-shaped in some of its sections. At the time we published the bill, we endeavored to point out its defects; and we have no doubt that when it is discussed, section after section, the objectionable features will be lopped off.

#### LEGISLATION FOR HOGS.

A citizen of Kentucky—William Corbett—has applied to Congress for compensation for discovering a cure for hog cholera. Now, if Dr. Corbett has really made a useful discovery of this kind, Congress ought to buy the secret and give it to the world. This is one of the few cases where the patent laws cannot protect the discoverer from infringement; and unless he can get some compensation to reveal the secret, our hogs must either rely upon the personal skill of Dr. Corbett or give up the ghost. The utter impracticability of relying upon him in such an emergency is apparent; therefore, unless our legislative fathers have no fellow-feeling for swine, they will hurry up an appropriation in their behalf.

#### COLT'S REVOLVER.

Samuel Colt, the patentee of the famous six-shooter, has just made application (through Mr. Loomis, a representative in Congress from Connecticut) for a renewal of his patent, known as "Colt's Rotating Chamber Firearms." Colt has had pretty hard luck heretofore in attempting to get Congress to renew his patent; but he evidently thinks that, by steady perseverance, he may at some time accomplish his object. We recommend to Col. Colt the perusal of the first verse of the 11th chapter of Hebrews.

#### WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

#### PILED FABRICS.

This invention relates to the manufacture of piled fabrics suitable for carpets or for other purposes by the introduction into a previously woven foundation of canvas or other fabric, of threads which after being passed through the said foundation in the form of rows of loops at regular or suitable intervals, are secured by a continuous fill-

ing thread which passes through the several rows of loops in succession. In this way a pile may be produced on either or both sides of the foundation; the loops forming it on one side, and the portion of the thread between the loops forming it on the other side, and by cutting the thread between the loops a cut on velvet pile may be produced on one side. The invention consists in the employment in this manufacture, of a series of needles arranged side by side at suitable distances apart for passing the threads through the foundation, in the form of loops, in rows extending the whole width of the fabric, and a long needle operating transversely to the first mentioned or loop needles, for carrying the filling thread through the loops. The invention also consists in a certain contrivance for holding the filling thread during the retreat of the needle which passes it through the loops, for the purpose of preventing the said thread being withdrawn wholly or partly from the loops by the retreat of its needle; also in a certain contrivance for feeding the foundation to the needles for the reception of the pile thread, and certain means for operating a set of rods or wires employed for the purpose of forming the pile. This machine somewhat resembles a sewing machine with a large number of needles ranged side by side and operating together. The credit of this contrivance is due to Charles Miller, an ingenious mechanic of this city. The patent is assigned to George Ricardo, 499 Third-avenue.

#### MANUFACTURE OF RESIN.

H. Napier, of Brooklyn, N. Y., is the inventor of a process of obtaining oil of turpentine and fine white resin by a continuous operation. The crude turpentine is put into a still and heated to a temperature of about 245° Fah., and steam at the same temperature, that is to say, at a pressure of about 10 pounds, admitted among it in such manner as to penetrate the whole of the mass. The steam carries over the oil of turpentine into the condensing worm and separation is effected by condensing in the usual way. When the oil of turpentine has all come over, the temperature of the still is raised to from 250° to 600° Fah., the steam being kept blowing through the mass at the same pressure above stated, the residual portion of the crude turpentine then rises in vapor, and passes over with the steam to a receiver which is kept as cool as possible by water, and in which the vapor is condensed and found to consist of resin of the purest quality obtainable, but slightly opaque from the presence of a little moisture which may be easily removed by remelting the mass and exposing it to a temperature of 213° Fah.

#### CAR SEAT.

This invention relates to an improvement in that class of car seats in which adjustable backs are employed for converting, when necessary, the seats into lounges or couches. The invention consists in having two backs to each seat and connected by gearing, and having the upholstery connected with certain automatic mechanism, all being so arranged that the backs may be more or less inclined and consequently increased in height as desired, one being used as a support to the lower extremities of the occupants, and either used as a back as occasion may require; the upholstery in consequence of its connection with the mechanism above referred to, being allowed to conform automatically to the adjustment of the backs. This device has been patented to Samuel McGregor, of Logansport, Ind.

#### STEAM TRAP.

This invention relates to that kind of steam trap in which the operation of the water escape valve is controlled by a flexible diaphragm which is acted upon by the expansion and contraction of the liquid in a vessel heated by the water or steam in the escape pipe. The improvement consists in a novel arrangement of the valve the diaphragm and the chamber, relatively to each other and to the escape pipe, whereby the valve is rendered more sensitive, and a freer escape for the water and sediment is provided than in other steam traps operating on the same principle. The inventor of this improvement is Levi Ferguson, of Lowell, Mass.

#### REVOLVER.

In this revolver the caps or primers are placed in the hollow stem in which the many-chambered cylinder revolves. The cocking of the pistol causes one cap to discharge from the stem, and a slide to take the same and place it in line with a capnipple. The pulling of the trigger or falling of the hammer or cock causes the bulk of primers to pass into the stem beyond the influence of the explosion. This is certainly one of the simplest and

most complete self-priming fire-arms ever patented. The credit of this invention is due to W. H. Bell, of Washington, D. C. The inventor has taken steps to apply for foreign patents. This patent was issued March 20, 1860.

#### QUARTZ-CRUSHER.

This invention consists in a concave trough suspended on an axis so as to swing back and forth. A grooved gravitating roller rests on the bottom of the concave. At each end of the concave a screw is arranged. The quartz are placed on the bottom of the trough and as the trough swings back and forth, the quartz are crushed between the grooved weighted rollers, and the toothed grooved bottom of the concave. Scoville and Fraser, of Chicago, Ill., are the patentees. This patent was issued March 20, 1860.

#### FOREIGN NEWS AND MARKETS.

*Extraordinary Petition.*—The following singular petition was lately presented to the British House of Commons:—"We the undersigned Poor Men of the parish of Winterslow, county of Wilts, do humbly solicit the attention of your honble. House to our humble petition. Being poor labouring men, mostly with families and aged, and living in a woody district of the country, where there is a great many English truffles grow, which we cannot find without dogs, we do therefore keep and use a small pudle sort of dog, wholely and soley for that and no other purpose; and as it is in the winter season of the year when we gather them, when labourers is generally on the excess in our neighbourhood, we often are enabled by the aforesaid dogs to provide a subsistence for our families, otherwise we should often be a burden to the parish; and as it hath been carried on by our ancestors for generations past without paying any tax for the dogs; but as the tax is now levied upon us—viz. twelve shillings per year, and as we have to keep our dogs six months when we have no use for them, it presses so heavy upon us that without redress we shall in most cases be obliged to make a sacrifice of our dogs, and thereby become a burden to the parish, and in some cases paupers on the union; and, as it did please your honble. House in its wisdom to exempt dogs used purposely for cattle for the maintenance of shepherds, &c., from paying of tax, we do humbly beg that your honble. House will take our case into your consideration, and exempt us from paying tax on our truffle dogs, that we may be enabled to follow our avocation for ours and our families subsistence."

The truffle is a subterranean fungus, of a roundish, oblong form, and a blackish brown color, and it is much used in cooking. It is hunted both by dogs and pigs, trained for that purpose, in soil beneath trees, especially oaks and beeches, and is found in but few places. It has never yet been cultivated with success, although many attempts have been made for this purpose. French truffles are imported to some extent into the United States. They charge a most astounding price for a dish of them in French restaurants.

*A Curious Surgical Case.*—A rare instance of a perfect recovery from a desperate wound was recently brought under the notice of the Academy of Medicine (Paris), by Mr. Larrey, who at the same time presented to that body an American, M. Preterre, to whose mechanical skill the attainment of the full result was due. At the battle of Magenta, a sergeant of the 85th of the line was struck by a musket ball, which, after completely shattering the lower jaw, came out behind from under the skull, close to the cervical vertebra, which had they been injured would have rendered the case hopeless. It is hardly credible that so extensive an injury, inflicted in such an important region of the human frame, could have admitted of cure; and it reflects high credit on the army surgeons who attended him. To restore the power of mastication by mechanical means, M. Preterre was called in, and succeeded in his task by an ingenious contrivance, which has been greatly admired by the first surgeons in Paris.

*Indian River Navigation.*—One of a number of vessels building by Messrs. John Laird & Sons, at Birkenhead, (England) was lately tried on the Mersey, and excited a great deal of interest and attention from its novel appearance. The hull is 260 feet long and 36 feet beam, and is constructed of steel plates, the vessel in general appearance much resembling the American river steamers. She drew about 18 inches of water at the bow, and