EDITORIAL CORRESPONDENCE.

WASHINGTON, Jan. 17, 1865.

Washington presents all the life and animation that usually mark the period immediately succeeding the holidays. All the hotels and boarding-houses are filled to overflowing, and private residences are very difficult to be obtained. Since the passage of the act of Congress authorizing the enlargement of the Capitol and Treasury buildings, which indicates a permanent retention of this spot as the Federal Capital, real estate has greatly advanced in price; fine dwellings have rapidly increased; rents are very high, and many improvements have been introduced, prominent among which are the extensive water works and the net work of horse railways now completed and in progress. These add much to the convenience of the people in this "city of magnificent distances," and, thus far, greatly benefit those who have secured charters for the roads, which are admirably built and furnished, and, so far as I could judge, are well managed.

What a wonderful improvement on the old omnibus system, which is rapidly becoming obsolete, are these tramways on city thoroughfares. Omnibuses can neither compete with the rail cars nor can they accommodate the increasing demands of city travel, and the ignorant prejudice against tramways is dying out in proportion as the people experience their great benefits.

Since my last visit to Washington a marked change for the better is quite apparent. Then the streets were thronged with soldiers, horses, mules, cattle, army wagons, and other appendages of military operations, while the hotels were overrun with the shoulder-strap gentry, and, I must say, often to the discredit of the service, and much to the annoyance of the guests. The city was also a beleaguered city; the rebel hosts with their defiant banners, were hugging closely its outer ramparts, causing, meanwhile, most manifest uneasiness on the part of the residents, which those who were far away, in snug and safe quarters, could not appreciate. Many of the Departments were barricaded, and the employees generally armed to assist in repelling a threatened attack. Thanks to Gen. Grant and his brave troops, the scene is changed—Washington has nearly returned to its normal repose: a few sentinels pace their weary rounds; mounted guardsmen to patrol the streets are well nigh dispensed with, and in all the Departments there is the bustle of active and almost unceasing official duty.

THE PRESIDENT AND INVENTORS.

The first reception for the season of the Chief Magistrate was perhaps the most brilliantly thronged of any that I have ever before attended. Members of the Cabinet, Judges, Senators, Foreign Ministers and attaches, officers, soldiers and citizens, were there to pay respect to the Executive head of the nation. These great gatherings evince, perhaps, what was proved at the ballot box—the general popularity of the President—for, irrespective of any mere partisan idea, which is unworthy of being cherished as a ground of personal disrespect, I could not fail to regard with gratification the general good feeling which was manifested toward his person, despite a homely and somewhat awkward figure, the effect of which is greatly lessened by personal contact. He seemed not to tire of the constant hand-shaking, which is the citizen's prerogative on such occasions, but maintained a constant flow of genial mirth, an element in his nature which has lightened very much the heavy weight of care that rests upon him as President of the Republic.

I was much pleased to learn that in the midst of the many cares that press upon the President he is not indifferent to the claims of our inventors. Himself an inventor and patentee, he readily discerns the intrinsic value of all good inventions, not only to the public service, but also in their application to the industrial arts generally, and he will do all in his power to encourage and to promote the progress of these arts, by sanctioning all wise legislation in behalf of inventors.

The reception of Speaker Colfax, who is really one of the most genial and popular men in Washington, was attended by many of the most eminent men in the nation.

THE PATENT OFFICE.

My first interest very naturally centered in the Patent Office. Here I found Mr. Holloway and his efficient Chief Clerk, Mr. Hays, aided by a well-chosen and intelligent Board of Examiners and clerks, prompt and laborious in the discharge of their duties. I think I am warranted in saying that, on the whole, the Patent Office was never better conducted than now. I learn from inquiry in the office, and the records establish the fact, that the applications made through the Scientific American Patent Agency amount to nearly one-half of the whole that are presented, and the uniform testimony of the Examiners is, that the cases of no other agency are more carefully prepared. This certainly speaks well of the experience and admirable efficiency of the most extensive patent agency in the world. The influence of the SCIENTIFIC AMERICAN has done vastly more than any other agent in promoting the ingenuity of our people, and in building up the Patent Office to its present gigantic proportion. This fact is now thoroughly recognized in the office, and very naturally exerts its proper influence upon all officers of the Department. They regard this journal as the active supporter and ally of the office.

The Patent-Office building is now complete, and workmen are busy in fitting up cabinets in the large hall of the north front for the reception of models. Three other immense halls are now entirely devoted to this purpose, the average length of each being about 275 feet by 70 feet in width. A few years hence these all will be filled with the trophies of American ingenuity, and what will then be done with them is a question which even now begins to force itself upon the mind. Either a new building will have to be erected for their reception, or the law must be so amended as to entirely dispense with models. The amount of money and of patient labor invested in these miniature machines is almost incredible. The large hall over the main entrance to the Patent Office—once occupied as a national gallery or museum—is now the center of much interest, and is called the "Salle des Beaux Arts," or hall of fine arts. The decorations are novel, fanciful, and, in some respects, beautiful. Here is the only instance in this country, I believe, where the art of polychromy has been elaborately applied to the interior decorations of a public edifice. Hittorf, a celebrated traveler and explorer, published many years ago the result of his discoveries in this art as it was applied to the adorning of ancient monuments and architecture in Greece and Sicily, and since that time men of truly artistic taste have searched diligently for corroborative proofs of the facts asserted in his writings, and considerable has been done in Europe to make this art subservient to the interior decorations of public buildings.

The ceilings and pilasters of the new hall of fine arts are very chaste and beautiful, certainly as fine as anything of the kind I have before seen. The immense stone columns that support the barrel arches of the hall are painted in deep ultramarine, while the pedestals upon which they stand are painted black, relieved by white lines. Considerable unfriendly criticism has been bestowed upon these heavy blue columns, yet in the face of all such censure, and after a careful study of the effect produced in the wonderful blending of other colors, such as red, yellow and green, I think the conception, on the whole, is truly artistic. The black and white striped pedestals are in the worst possible taste, and ought to be redecorated at once. They look like big tea chests, and create the impression that they are doing their best to support a very heavy weight. Some will judge that these decorations were suggested by the arts of painting as practised by North American Indians, while others, and I think the larger portion, will regard them as the results of a truly cultivated taste.

Workmen are now engaged in this hall of fine arts in putting up handsome walnut cabinets, and it is the design of Commissioner Holloway, out of the surplus funds of the Patent Office, to introduce, as in the Conservatory of Arts in Paris, models of machinery and tools illustrating all the principal industrial arts of the country, as glass-making, sugar-refining, etc. The idea is a magnificent one, and, if carried out with good judgment and skill, the hall will become a point of the greatest interest and instruction to visitors. I wish that New Yorkers could be stirred up to establish just such a museum in the Central Park; it would be wonderfully attractive.

PATENT EXTENSION CASES.

Not much is doing at the present session of Congress in reference to Patents or the Patent Laws. In the House Committee on Patents, of which the Hon. Thos. A. Jenckes, of Rhode Island, who is well known to the readers of the SCIENTIFIC AMERICAN as one of the ablest patent lawyers of the country, is chairman, several extension cases are now pending its action, prominent among which are the Goodyear India-rubber patents which expire in June next; McCormick's Reaper; Fitzgerald's Fire-proof Safes, and others of less note. As the session will be a short one, and there is an immense press of public business, it is doubtful whether Congress will be able to consider all the cases before the Committee. The Goodyear case is receiving most attention, and may be brought forward. The heirs of Goodyear, who are said to be really quite poor, have, as I understand, modified their petition, and instead of asking an extension of the patents by act of Congress—a species of legislation which the SCIENTIFIC AMERICAN has always opposed—now apply for a bill to refer the case to the Commissioner of Patents, with power to hear testimony, as in all other cases of extension under the general law, and to decide it judicially upon law and evidence. This course is far preferable to the custom of besieging Congress to act directly in such cases.

PATENT LAW AMENDMENTS.

There is also pending before the Senate and House Committees a bill to amend the act of March, 1863, which requires the balance of the patent fee of $20 to be paid within six months after date of allowance, in default of which the invention becomes public, *as against the applicant only.* Under this stringent law many meritorious inventors—among whom are soldiers in the army on active duty—actually lose their patents; besides, the office suffers many inconveniences, and loses much revenue. The Commissioner of Patents warmly indorses the amendment, and I had the honor to present its merits to both Committees—the House and Senate. The relief, if granted at this session, will affect all cases now before the office, of which there are thousands. There is not a particle of opposition to the measure. Senators Cowan, Ramsey and Lane, also Mr. Jenckes, have all expressed themselves favorable to the proposed bill, and I have no doubt it will pass at this session. Applicants for patents whose interests are thus placed in jeopardy, ought to write to their Members of Congress, urging them to help the bill along

NATIONAL CURRENCY BUREAU.

During my visit I have been permitted to examine all the nice operations connected with the manufacture of ordnance and ammunition at the Washington Navy Yard, descriptions of which I do not feel at liberty to give. I was also permitted by Secretary Fessenden to visit the currency bureau of the Treasury Department. Persons are not allowed to visit this bureau for purposes of mere curiosity; therefore few passes are granted. As a matter of scientific interest I was honored with a pass, and witnessed every operation connected with the preparation of our issues of Government bonds and currency. I will not undertake to describe how five-twenties, ten-forties, greenbacks and the fractional currency are so beautifully and satisfactorily produced. This is quite well done on page No. 114, last volume, SCIENTIFIC AMERICAN, to which the reader is referred.

Upon entering the bronzing room I was greeted by Mr. Dunn, one of our former patrons. He has invented a very ingenious and beautiful machine for bronzing the currency; or, as some one has said, "to give it a metallic ring." It is, I believe, the only good machine for the purpose. There are also some ingenious machines for cutting the sheets of currency into parts and counting the exact numbers cut. Some recently-improved machines cut both ways at the same operation.

The question of dry printing by hydrostatic pressure, to which reference is made on page No. 294 of our last volume, is practically settled. Some eighty of these presses are printing fractional currency, and it is done more rapidly, I think, than by the process of wet printing. There is less manipulation required, while the work is finished in a superior manner. The dry process is gaining favor rapidly.

In the absence of Mr. S. M. Clark, the superintendent, I was shown through the bureau by Mr. E. H. Dougherty, his efficient assistant. Hundreds of

men and women are here employed, and many millions of bonds and currency have passed through their hands, thus far without the loss of a dollar. There were at the time of my visit upward of one hundred and thirty millions of dollars in the iron vaults. • • •

PROFESSOR PAGE THE INVENTOR OF THE RUHMKORFF COIL.

[For the Scientific American.

In the SCIENTIFIC AMERICAN of Jan. 2d, 1865, you have described the Ruhmkorff coil to consist of the following parts:—a primary coil of insulated wire surrounding an electro-magnetic case consisting of a bundle of wires of soft iron, a secondary coil of fine wire of great length and carefully insulated, surrounding the primary coil, and a vibrating hammer or automatic circuit breaker. On connecting a small galvanic battery with the primary coil, the hammer is immediately set in motion, and the rapid breaking of the circuit caused by its motions produces currents of high intensity, and some of the brilliant appearances of statical or frictional electricity. It might have been added that Fizeau suggested the use of a peculiar condenser with the Ruhmkorff coil by which its electrostatic properties were displayed with great splendor. Having been informed that the instrument thus described as Ruhmkorff's was the invention of Prof. Page of Washington, I have taken some pains to inquire into the facts, and find that the entire instrument was made by him in 1838. The following facts appear in the public records of the Patent Office:—

"On the 2d of February, 1854, Prof. Page applied for a patent for an instrument identical in all its parts with that described as the Ruhmkorff coil. The Patent Office, upon a hasty examination, at first refused the claim upon the ground that the automatic circuit breaker, in connection with the induction coil, was described by D. Golding Bird, in the *London, Edinburgh and Dublin Philosophical Magazine*, for January, 1838. It so happened that the office had failed to notice the conclusion of Golding Bird's communication in which he says, "the credit of the invention must be given to Dr. Page." Attention having been directed thereto the Patent Office admitted Prof. Page's claim to originality, but subsequently refused the patent upon the ground that the invention had been dedicated to the public. How far this invention anticipated the Ruhmkorff coil will be seen from the descriptive catalogue of Daniel Davis, of Boston, published in 1840, in which he says that this induction coil affords a "light between separated charcoal points," and "charges the Leyden jar." The instrument is there called the "compound magnet and electrotome," and was subsequently made and sold under various names, such as "Page's Analysis of Shocks," "Separable Helices," etc. The identical instrument I find described in *Silliman's Journal*, Vol. XXXV., Jan., 1839. The electrostatic powers of this instrument as described are fully equal to the past editions of the Ruhmkorff coil, and I have been shown a programme of experiments recently made at Public School, No. 11, Brooklyn, N. Y., in which occurs the following announcement, "Page's Analysis of Shocks same as Ruhmkorff's Coil." These experiments were conducted by N. B. Chamberlain, of Boston. Mr. Chamberlain exhibits the sparks, the charging of the Leyden jar and all the beautiful experiments with the vacuum tubes with Page's coil, precisely as they are performed with the Ruhmkorff, the only difference being that the Page coil is on a smaller scale and much less expensive.

The intensifying power of the bundle of iron wires in the coil was discovered by Prof. Page and published by him in *Silliman's Journal*, Vol. XXXIV., for July, 1838, and the first application of it within the induction coil led to the development of its electrostatic properties.

With all these facts before us it is evident that the so called Ruhmkorff coil was the invention of Prof. Page, and the Imperial award of 50,000 francs to Ruhmkorff by the French Commission must have been made in entire ignorance of Prof. Page's claims, an oversight of American achievements by European savans already too common.

New York, Jan. 16, 1865. S. H. W.

Correspondence

Cone Pulleys for Given Velocities.

MESSRS. EDITORS.—In a late number of the SCIENTIFIC AMERICAN is a method of ascertaining the diameters of cone pulleys, which will do when definite velocities are not required, but as that is sometimes a desirable end I send the following rule:—Suppose the velocity of the upper or driving cone to be 100, the joint diameter of the two cones 20 inches, and the velocities required 75, 150, 225, 300. Write down the velocities required as above, and under each write that of the upper cone; add them together, and set the amounts under, as in addition, and make each amount the denominator of a fraction, of which the velocity of the upper or driving cone, say, is the numerator. Multiply the joint diameter, 20, by each of the fractions so found, and the products will be the several diameters of the pulleys upon the driving cone. The same operation, repeated with the velocities sought, as denominators, will give the diameters of the driven cone. Example:—

75	150	225	300
100	100	100	100
175	250	325	400

$100 \div 175 \times 20 = 11\frac{3}{7}$
$100 \div 250 \times 20 = 8$
$100 \div 325 \times 20 = 6\frac{2}{5}$
$100 \div 400 \times 20 = 5$

$75 \div 175 \times 20 = 8\frac{4}{7} + 11\frac{3}{7} = 20$
$150 \div 250 \times 20 = 12 + 8 = 20$
$225 \div 325 \times 20 = 13\frac{1}{13} + 6\frac{2}{13} = 20$
$300 \div 400 \times 20 = 15 + 5 = 20$

It may be objected to this method that it does not make allowance for the angle of the belt; but in the above example I find the variation to be but ·1 in a distance of 6 feet between shafts—a difference which would scarcely be perceptible in the tension of the belt. If, however, the distance at which the shafts are known are to run is known, and it is desirable to be accurate, one of the cones may be set back of the lathe the proper distance, and the others may be turned by a tape line until the tension is equal upon all the pulleys. I have found this to work well in practice, and it is simple enough to be within the reach of any mechanic who is likely to have cones to make. S. H. WILDES.

Central City, Col. Ter., Dec. 21, 1864.

Rules for Measuring Grain.

MESSRS. EDITORS:—I venture to offer you for publication the following rules for measuring grain. Dimensions are taken in inches, and the Winchester bushel—the standard of the United States—contains 2150·42 cubic inches:—

To measure grain in a bin, multiply the product of the length, breadth and depth by 10, and divide by 21504 for the number of bushels.

To measure grain in heaps:—Multiply the sum of the perpendicular and slant hights, their difference, and the perpendicular hight together, and the product by ·00048 when it is heaped in the middle of a floor; by ·00024 when heaped against the sides of a barn; by ·00012 when it is heaped in the corner of a barn; and in each case the last product will be the answer in bushels.

The second statement may be demonstrated thus:—Let a equal the slant hight, and b the perpendicular hight. Then $a^2 - b^2$ equals the square of radius of base of heap, and $(a^2 - b^2)3{\cdot}141592$ equals area of base of heap, and $(a^2 - b^2)3{\cdot}141592 \times b \div 3$ equals the solid contents of heap in inches, which being divided by 2150·42 and reduced, equals $(a^2 - b^2)b \times {\cdot}00048$, which, since $a^2 - b^2 = (a+b)(a-b)$, becomes $(a+b)(a-b)b \times {\cdot}00048$. Q. E. D. M. V. B. P.

Danville, C. E., Dec. 1864.

Hand Carding, Spinning, and Weaving.

MESSRS. EDITORS:—I have been a constant reader of your valuable Journal for many years, and have come to regard it as the fountain of knowledge.

This island is very much in need of a hand carding, spinning, and weaving machine for working up the cotton grown here. As labor is very cheap, many girls who are unable to do field work might make a livelihood at this branch of business. Can you inform me where such a machine can be purchased, and at what price, or with whom I can correspond in regard to the matter? JOHN MCDONALD.

Kingston, Jamaica, Jan. 6, 1865.

HARDENING AND TEMPERING STEEL.

Steel is hardened by being heated a bright cherry-red, and plunged in cold water. The brittleness and hardness are then modified by gradually warming the metal, either over a fire, or by placing it on a hot metal plate, or in an oven, or in an oil bath. Some large manufacturers of cutlery use a tempering oven, the temperature of which is regulated by a thermometer. This saves a great deal of high-priced labor, and secures a uniform result. The following degrees of temperature and corresponding colors of the steel, for different purposes, are given in many books:—

Corresponding Temperature.		
A very pale straw.....430°	Lancets	
Straw.....450°	Razors	
Darker straw.....470°	Penknives	All kinds of wood tools
Yellow.....490°	Scissors	Screw taps.
Brown yellow.....500°	Hatchets, Chipping Chisels. Saws.	
Slightly tinged purple 520°		
Purple.....530°	All kinds percussive tools.	
Dark purple.....550°	Springs.	
Blue.....570°		
Dark blue.....600°	Soft, for saws.	

GUNS BURSTING IN ACTION.

At the first attack on Wilmington no less than six 100 pound Parrott guns are said to have burst. These guns are the best service guns in the world, and are acknowledged as such by unprejudiced persons. At the last attack on Wilmington, two fifteen-inch guns burst, doing but little injury, fortunately, to those in their vicinity. This will be hailed by those who condemn cast iron ordnance as proof positive of the correctness of their assertions, but it is no more evidence of the unfitness of cast iron for artillery than the explosion of a boiler shows wrought iron to be unfit for generating steam. In the excitement of battle very many exigencies arise, and omissions occur which frequently result in disaster, and it is mainly to such causes that we attribute the recent failure of the Parrot rifles and the large guns.

The official investigation at Washington into the explosions in question will, we hope, result in some specific verdict and make the true cause public.

Another Iron Letter.

In our impression for Dec. 2nd we described an iron letter, the pages of which were rolled at the Sligo Ironworks, Pittsburgh, Pennsylvania. The makers claimed that this iron was the thinnest ever produced. During the present week we have had some specimens of sheet iron brought under our notice which are nearly one-tenth thinner than the iron of the American letter. The plates were rolled by Messrs. T. W. Booker & Co., Mellingriffith Works, Cardiff. They are barely the 1,000 part of an inch in thickness. A piece 8 in. long by $5\frac{1}{4}$ in. broad, weighs $62\frac{1}{2}$ grains only. The quality of the plates is admirable. They possess toughness and flexibility in no ordinary degree. We have very little doubt that these plates are the thinnest ever produced.—*London Engineer.*

THE enormous demand that has sprung up for the series of dyes that are prepared from coal has probably no parallel in the history of color manufactures. Mauve, magenta, girofila, and other popular colors are all produced by scientific treatment of certain substances that are produced during the distillation of coal. It is said the discoverer of these dyes was a lad in the City of London School, now grown to man's estate, and enjoying an income of several thousands a-year as his share of the profits of the manufacture of these dyes.

IN Hitchcock's "Method of Forging Cannon," published on page 50, current volume SCIENTIFIC AMERICAN, some typographical errors occurred which changed the sense; the rings are said to be formed in a modification of the *tin* rolling machine. It should read *tire* rolling machine.