Scientific American.

NEW YORK, JUNE 20, 1857.

The Electric Telegraph.

The inventions of olden times, useful and beautiful though many of them were—such as the telescope, chronometer and magnet—dwindle into insignificance beside those of our day. The steam engine, with its vast application to every species of labor, locomotion, and navigation, has changed the social habits of life; and the electric telegraph, by transmitting messages from place to place on lightning's wings, has given to man transcendent powers over space and time. The latter invention is among the grandest achievements of science, skill and enterprise the world has ever seen. The rapidity of its application for the purpose of conveying intelligence seems more like a miracle than the efforts of men. It is only thirteen years this month since the first telegraphic line was erected on this continent, viz., that between Washington and Baltimore, forty miles long; now, we have been credibly informed. there are between forty and fifty thousand miles in operation. Almost within the same period, twenty-six thousand miles of wires have been constructed in Great Britain, and all Europe has been interlaced with electric cords. They pass over the Alps and the Pyrenees; under the waters of the North Sea and the Mediterranean, and gigantic preparations are now being made to enable the Old and New Worlds to hold conversation together through the waters of the Great Atlantic.

Electricity had been sent along wires several miles in length in the days of Franklin, and the possibility of applying it to telegraphic purposes had been suggested as early as 1753, more than a century ago. It was not, however, until very recently, that the inventive genius of man had devised and constructed a machine to harness the electric fluid, and render it capable of speaking in public. The first electric telegraph employed publicly in England operated by signals; the American telegraph records its messages, and is thus superior to the visual telegraph which it has effectually superseded. Three kinds of recording telegraphs have been brought into use; that of Professor Morse, which mechanically records its messages in dots, dashes and spaces, representing letters; that of Bain, which records chemically its messages in the same kind of characters, and that of R. E. House, which prints its messages in the letters of the common alphabet. The chemical telegraph, although the most simple and capable of being operated with the least amount of battery, is liable to make continuous lines instead of dots and dashes, especially during electrical disturbances of the atmosphere. The "Morse" telegraph is the one in general use, because it is so simple, and can be operated with so much less battery power than the very ingenious, but complex, printing telegraph. But were the printing telegraph simplified in its construction, and more perfect in its operations, it appears to us that it would be preferred, for it gives out its messages just as they are received. In the *character telegraph* of Professor Morse, two dots may be run together and form a dash, and thus make a mistake, and again in the transcribing of the messages mistakes are also liable to be made. It is, however, troublesome to keep the common printing telegraph in perfect register, and unless the machine at a receiving station is in perfect register with the keys at the transmitting station, it will print wrong messages. This frequently occurs. Were a remedy provided for its rapid and easy register, it would be a great improvement.

A few days since, we witnessed in operation a new printing telegraph, designed by E. F. Barnes, this city, which provides a remedy for this evil. The type wheel has not a continuous rotary but a vibrating motion, and after each letter is printed it returns back to the point where it started. The letters on the type wheel are arranged in the order in which they occur oftenest in telegraphing, by which arrangement an average of less than seven vibrations, or one-fourth the circumference of the type wheel is necessary to the attainment of each letter, instead of fourteen vibrations or one half the circumference of the wheel, as is the case in all printing instruments where the type wheel makes continuous revolutions. The key board, or transmitting portion of the apparatus, is exceedingly simple; an arm attached to the "circuit-breaker" retreats to a given starting point after the completion of each letter, making the "circuit-breaker" constantly self-adjustable.

In this machine there is a *mutator* for breaking and closing the local circuit, which has a permanent steel U magnet for an armature to the electro magnet, instead of the iron armature in common use. It is very constant in its action during electrical disturbances of the atmosphere, and will act when the soft iron armature is rendered useless. Two of these telegraphs have been constructed in the machine shop of Reeves & Co., Canal street, this city. Simplicity is one great object in the attainment of perfection in machinery. This printing telegraph is very simple in comparison with those now in use, and it can be operated without any difficulty by a very inexperienced person after a few lessons.

A machine of liberal proportions has been constructed in this city, for the purpose of being worked by a steam engine, to generate a magneto-electric current by the revolution of permanent magnets in proximity to insulated coils; and it has been suggested that this would be the best method of operating the Atlantic Telegraph, instead of using immense batteries to generate sufficient galvanism. We have always considered that the generation of an electric current by the magneto-electric machine, for telegraphic purposes, was similar in its character to the French invention for generating steam to propel engines, by friction, in place of the consumption of coal. For such an extent of line as the Atlantic cable, three thousand miles long, it may prove to be the best method, although we are very skeptical on the subject. But as electric apparatus of all kinds is attracting much public attention at present, we hope that this, as well as every other new electric machine, will receive a fair test of its qualities. This is the only true method to progress and improve.

Inspectors of Steamboats.

Among the seekers of offices at Washington, we have been informed that not a few are applying for those of steamboat inspectors, created under the act of Congress of 1852. The fact of these applications being made at this time, would indicate that the applicants are laboring under the impression that these offices are of a political character, and subject to change with every new administration, in the same manner as post offices, custom house offices, &c. But such was not the intention of Congress, as was shown by the debates on the bill when before the Senate in July 1852, when all parties conceded the propriety of keeping the offices of inspectors clear of political influence. And on this principle the appointments have heretofore been made—qualification alone being the criterion for such offices. No person who will consider the object for which this law was passed can come to any other conclusion, than that if the law is to accomplish its objects, an inspector who does his duty properly must not be subject to lose his office on mere political grounds, or on the rotation principle.

The language of the law is, that the President, with the advice of the Senate, "shall appoint nine supervising inspectors, who shall be selected for their knowledge, skill, and experience in the uses of steam for navigation, and who are competent judges, not only of the character of vessels, but of all parts of the machinery employed in steaming, who shall assemble together at such places as they shall agree upon, once in each year at least, for joint consultation and the establishment of such rules and regulations for their own conduct and that of the several boards of inspectors within the districts." These rules and regulations must be made in conformity with the law, otherwise they will be liable to lead to difficulty and illegal acts on the part of inspectors. The law also requires the inspectors in certain cases to act in a judicial character, "touching the performance of their duties by engineers and pilots," and for this purpose they are clothed with the "force to summon before them witnesses, and compel their attendance by the same process as in courts of law." These investigations are very frequently of the greatest importance, not only to those on trial, but to other interested parties; as in cases of collision between two boats, when the inspectors must investigate the conduct of the pilots on duty when the collision occurred. The decision of the inspectors in such cases very often determines the subsequent action of the parties injured by the accident. Hence it is that persons holding these offices should not only have the qualifications required by the act, but they should be men of good judgment, capabable of understanding the law and of executing it in a proper manner. This could hardly be expected of new and inexrienced persons who had never made the law their study. In fact, inspectors cannot have too much experience in these branches of their duties.

There are also other reasons why good and experienced men should not be removed from these offices, and among them is the further perfection of the system for the safety of life on these vessels. This can only be safely done by long experience and close observation by those having charge of the subject. Those who took part in the framing of the act of 1852, know the amount of labor spent upon it by some of the best men in that Congress, and by experts of large experience in every station of the steamboating business, and who were occupied on that measure during a large portion of that long session. It was then regarded as being very imperfect in many respects, but it was the best that could be framed at that time, and the further perfection of the system was left to the future, as experience in its operation would render evident. These imperfections and deficiencies have manifested themselves in many respects since the law has been in operation, and with a view to such additional legislation as was regarded necessary in the matter, the board of Supervising Inspectors were convened at Washington at an early day of the last Congress, for the purpose of furnishing committees of Congress with the result of their experience in the administration of the law, and to give their views in regard to the additional legislation necessary. This consultation resulted in a bill being reported from the Committee on Commerce, the provisions of which in many respects are of great public importance. The bill was not reached, however, before the adjournment of Congress, and therefore did not become a law. But as there is a great necessity for its passage, it will no doubt be resuscitated at an early day of the next Congress and probably passed. This will involve the necessity of additional rules and regulations being made by the inspectors in order to carry it into effect, and who are so capable of making these, as those who have already had the largest and *only* experience in such matters?

These offices, the sole object of which is the saving of human life, should be looked upon in a different light from many other offices of the government. When an officer performs his duty satisfatorily in every respect, his peculiar polititical creed should not subject him to removal.

We hope and have no doubt that with the present, as with the former administration, these arguments against the removal of competent and faithful inspectors, will have their proper influence.

Liquid Manuring.

We have had several inquiries respecting this method of fertilizing fields, since the paragraph published by us some weeks ago, in relation to the enormous crop of grass obtained on the Earl of Derby's estate last year. It is an agricultural question of no recent date, but it is only of late that it has attracted much public attention in England. On the continent of Europe (and in Scotland among vegetable gardeners) liquid manuring has been practiced for at least fifty years, and with marked success. It has long been practiced in Holland and Belgium. The people in these countries use the urine of the stable diluted with five times its quantity of water, cart it to the fields in casks, and allow it to flow over their young green crops, in the same manner that our streets are sprinkled with water. Fields of grass thus irrigated are cut from five to six times every year, and the crop is generally very heavy. As soon as the cut grass is removed, the field is irrigated with the liquid manure—generally the next day. Young wheat, oats and barley are irrigated in the same manner as grass. Large fields of cabbages, which are much used for feeding cattle in Holland, are irrigated in the same manner, but receive four or five applications during the season. Sewerage water is now being applied in England with good results, as a liquid manure, especially to gardens in the neighborhood of London.

The liquid manure of a farm should be collected in well covered tanks, puddled with clay, to prevent the loss or escape of the liquid. Each tank should be divided by a wall into two compartments, capable of holding each two or three months' supply. When the first is full, the stream should be turned into the second, and by the time this is full the first is fit for land. It ought always to be applied in a fermenting state.—The fresh urine of cattle, &c., ought to be mixed with its own bulk of water, by which means the loss of ammonia is prevented, as also the caustic effects of urine on the land. Sulphuric acid or burned gypsum may also be added to fix the ammonia. One thousand pounds of urine contain sixty-eight pounds of solid rich fertilizing matter.

Tempering Steel Blades and Dies.

If the blade is very thin, it may be heated in the flame of a spirit lamp, but if somewhat thick it is heated in a clear fire until it assumes a dull red color. It is then taken out and plunged into a bath of oil until ebullition ceases, then taken out, and, while wet, held over the flame of a fire, until the oil begins to burn; it is then plunged again into the oil bath, and kept therein until it is quite cold. This is a method by which steel tools receive an excellent spring temper.

Mr. Oldham, printing engineer of the Bank of England, who has had great experience in the treatment of steel for dies, says it should never be heated above the redness of sealing-wax. On taking it out, he hardens it by plunging it in olive oil, or naphtha, previously heated to two hundred degrees Fah. It is kept immersed only till the ebullition ceases, then instantly transferred into cold water, and kept there till quite cold. By this treatment it is stated the tools come out perfectly clean, and as hard as it is possible to make cast steel, while they are perfectly free from cracks and twists. This latter process deserves a trial by all who harden important cast steel instruments.

The Frigate Niagara and the Atlantic Cable.

It is well known that this noble frigate was sent to England to carry and lay down a part of the great Atlantic telegraph, but the Liverpool *Albion* states that she is incapable of performing this office. The *Niagara* was visited by a deputation of the Directors of the Telegraph Company, who thoroughly examined her, and found, to their regret, that there was not enough space in her to make sufficiently large coils of the cable to insure its safe delivery into the ocean. The British Government has very generously offered the Directors of the Atlantic Telegraph Company another steamship equal to the *Agamemnon*, to take the place of the *Niagara*, to assist in laying the Atlantic cable. The *Niagara* was, at the last advices, to be employed simply as an attendant and assistant in the operation.

Bombay Mechanics' Institute.

Away on the farther shores of India, a mechanics' institute has been established in Bombay, and it held its annual meeting on the 11th of April last. The Governor of the province, Lord Elphinstone, presided on the occasion, and awarded several prizes. It is stated to be a very prosperous and ably managed institution. They read the SCIENTIFIC AMERICAN.