

OPERATION

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THE CABLE'S MUSING.

Far down, where the bed of the ocean
Is wrapped in its colorless sea,
Where the blending of calm and commotion
Comes only as echoes to me,
Where the coral reefs serve me a pillow,
And the nautilus' lullaby seems
Like the murmuring cadence of billow,
To soften and sweeten my dreams;

I slumber alone in my dwelling,
Since Vulcan withdrew with his train,
And through me the nations are telling
Their throbbings of pleasure and pain;
And with fairy-winged messengers speeding,
My being is pierced o'er and o'er,
While the changes their missions are breeding,
Are trembling from opposite shore.

Now through the walled cities I'm roving,
Where hope adds a lustre to fame,
And tidings of joy to the loving
Are heard in the absent one's name;
Or out where the green hills are reaching
To kiss the blue canopied sky,
I live while all nature is teaching
The pleasures her members supply.

Again in the vast crowded city
I wander midst sorrow and care,
No rapture, no heart-feeling pity,
Is voiced in the still atmosphere.
A youth guides the way to the mountain,
Then points to a gentle slope,
And sighs, "There's the grave of life's fountain,
And there sleep the pleasures of hope."

Thus through me the dreams are revolving,
Each moment another recalls,
And the pictures so often dissolving
Life paints in my cloistered halls.
And the song in Æolus' measures,
The nautilus' lullaby seems,
While nations and oceans bring treasures
To soften and sweeten my dreams.

NEW YORK, March 21, 1881. FESTUS.

Our National Portrait Gallery.

PATRICK J. McMAHON.

Mr. P. J. McMahon, although a truly representative American telegrapher, was born in Ireland, February 4th 1848. He arrived in Boston with his parents in the autumn of the same year, and has since resided in New England, receiving his education in the Boston public schools. In 1868 young McMahon entered the telegraphic service as a messenger boy for the Vermont and Boston company, and, like most of our leading telegraphers, the messenger

boy, after speedily blossoming forth as an expert operator, shines to-day among the leading spirits of American telegraphy. At the time of the consolidation of the Western Union, American and Vermont and Boston companies, young McMahon was transferred to the Western Union office as clerk. He was soon afterward given a position as operator, and rapidly rose to the

and Stewart, all wonderfully fast senders, and the incomparable operators at the "drop" stations on that line—Baltimore, Philadelphia and New York. All agree that no more even-tempered and skillful operator ever touched a key. Again, in 1872, during the Grant convention, in Philadelphia, and during the Centennial pressure, in 1876, Mr. McMahon won golden opinions



PATRICK J. McMAHON.

front rank in the service, becoming renowned for his splendid "copy," and good work generally. The five years from 1872 to 1877 he spent on the Boston night force—probably one of the most trying telegraphic positions in the country—working the Washington "special" wire. During that time his method of working was the admiration of all who witnessed or heard it, and evoked frequent commendations from Manager Marean and Messrs. Austin, Fred. Marean, Hotchkiss

and laurels for himself both as an expert operator and a cultured gentleman. To-day he is without a superior as a telegraphist, although his wonderful abilities are partly thrown away on the Portland duplex.

Socially, Mr. McMahon is of a kind-hearted and extremely liberal disposition, a great favorite with those who come in contact with him, and is well known throughout the country. He has repeatedly refused tempting offers to go

elsewhere, seeming to believe that Boston is the only good place in the world to live in; and, being married now, he appears determined to remain there during the remainder of his life.

Unlike many telegraphers, Mr. McMahon has remained always close to home, appearing to regard it with all the fervency of his nature. Yet he enjoys travel and recreation in a rational manner, spending his customary month of summer vacation in the wilds of Northeastern Maine, in pursuit of the bounding deer, the stately moose and the silvery salmon. During the autumn and winter months his leisure time is said to be mainly occupied in vain endeavors to convince his office associates of the blessings which are to follow the success of the Greenback party in the nation.

Mr. McMahon has all the outward appearances of being extremely modest and retiring, but those who have heard him relate his wonderful achievements with the rod and rifle in the streams and woods of Maine, far from the correcting influence of the telegraph, with a furlough in his pocket, may possibly doubt the accuracy of this inference.

It is an old saying that what everybody says must be true; so that, in view of the general approbation, we have no fear in putting forth Mr. McMahon as a worthy representative of the very worthy telegraphers of New England.

Progress of the Consolidation and the Opposition Thereto.

On March 16 Mr. Rufus Hatch made a new attempt to defeat consolidation, based on the principles involved in the Williams suit, with which all readers of THE OPERATOR must be familiar. Mr. Hatch's new suit is against the three telegraph companies, the Union Trust Company and the directors of the Western Union Company, individually. As a stockholder of the Western Union Company, he says he does not choose to be bound by the acts of the directors and other stockholders of that corporation when such acts are clearly illegal, and he considers the purchase by the Western Union of the property of the other two corporations to have been "premature, erroneous, irregular, illegal and void," in that no authority was given to the directors of the Western Union by the stockholders to enter into the agreement of Jan. 19, and that the majority of the trustees and stockholders of the American Union Company had no authority to sell its property to the Western Union Company on credit, as they did. Finally, Mr. Hatch complains that it is the intention of the Western Union Company to pay a quarterly dividend of $1\frac{1}{2}$ per cent. upon the capital stock of \$80,000,000, in defiance of the order of the court. He asks a perpetual injunction restraining the four defendant corporations from doing any act under the agreement of Jan. 19, 1881, and that the individual defendants, the Directors of the Western Union, be compelled to pay any losses which have resulted or may result to the company through that agreement. A temporary injunction was granted returnable on the 18th ult.

On that date the case was resumed, and almost interminable legal arguments followed, one side demonstrating to its own satisfaction that Rufus Hatch bought 100 shares of American Union stock one day prior to that on which the agreement of consolidation was entered into by the three telegraph companies, and with full knowledge that the agreement was in contemplation; that his suit was brought for stock-jobbing pur-

poses; that he was inspired by unworthy motives in his litigation, and had said he would withdraw all his opposition to the consolidation of the companies if his American Union stock were bought from him at the price of Western Union; while, on the other hand, the opposing counsel showed that the consolidation was little less than public robbery.

During the progress of this argument Mr. Hatch, on the 19th ult., began a new suit—suit number three. This was brought in the Superior Court, the principal defendants this time being the American Union Telegraph Company and its directors. The Western Union and Atlantic & Pacific companies and the Union Trust Company are joined as defendants. He brings this suit as the owner of 100 shares of American Union stock. His complaint is almost identical with that in the suit in the same court in which he sues as stockholder of the Western Union Company.

In addition to the Hatch suit, the Compagnie Française du Télégraphe de Paris à New York (better known as the French Cable Co.) has renewed the struggle to prevent the consolidation of the land lines. On the 14th ult., this company filed in the United States Circuit Court a re-amended bill of complaint against the Western Union, American Union, and Atlantic & Pacific Telegraph Companies, and the Union Trust Company.

The cable company asks that the consolidation of the land line companies be declared null and void; that the contract of Dec. 18, between the American Union, and Jay Gould and his associates, be also declared null and void; that all leases of wires or transfers of property between the companies be enjoined, and that the American Union be enjoined from discontinuing the interchange and transfer of messages under its original contract with the complainant.

On the 26th ult. "the Williams suit" came up before Judge Speir, on motion for an order to show cause why the defendant companies should not be punished for contempt in violating the injunction order of Judge Sedgwick. Judge Speir named March 30 for hearing argument on the dissolution of the injunction. Motion for contempt was then argued at great length, and upon its conclusion Judge Speir took the papers and reserved his decision.

Meanwhile the enemies of monopoly have not been idle.

The Produce, Cotton and Petroleum exchanges have prepared a circular to be sent to similar organizations throughout the country in relation to the formation of a telegraph company which cannot be bought out or absorbed. It says:

"To this end we advocate the creation of a new telegraph company, whose constitution shall embrace such provisions and conditions as will preclude its consolidation or absorption by any rival interest.

"We propose, therefore, that the voting power on over one-half of its stock shall be permanently vested in a board of trustees, of whom a majority shall be selected from among the presidents of such commercial associations or exchanges as shall be hereafter designated, and who shall be ex-officio members of the said board.

"This plan of trusteeship will, it is believed, prove an effectual barrier against any effort to subvert the company we propose to create by any act or plan alien to its interests, or foreign to the purposes herein set forth.

"It is believed that \$10,000,000 properly expended will give us ultimately as perfect a system of telegraphy as that now represented by \$80,000,000."

In the Pennsylvania Senate, on the 24th ult., the bill to escheat to the Commonwealth telegraph lines which shall consolidate was advanced to a third reading. The character of the measure is fairly indicated by its title: "An act to escheat to the Commonwealth the telegraph lines and property of telegraph corporations, associations and companies which violate the provisions of the Constitution prohibiting the consolidation with, or the holding of a controlling interest in, the stock or bonds of a competing line of telegraph, or the acquisition by purchase, or otherwise, of any other competing line of telegraph." The bill has not yet been considered in the House.

The Legislature of Connecticut has incorporated the "International Construction Company," with somewhat sweeping powers. It proposes to build the international railway to the city of Mexico. The act of incorporation empowers it "to build, construct, enlarge, repair, complete, equip, furnish, and operate, etc., railroads, railroad bridges, telegraph lines and all necessary appurtenances in any State or Territory of the United States, or in any foreign country," with power to lease other roads or telegraph lines; "to make joint stock with any other corporation; to receive in payment cash, notes, bonds, stocks, or other securities, from any individuals or corporations, and securities issued by any government, state, county, town, or municipal corporation;" "to construct or operate roads "by contract or otherwise; to own and operate steamship lines, steamboat lines and ferry-boats; to borrow and loan money, issue its own bonds, etc., at rates of interest not exceeding 8 per cent.; to make advances of money to railroad, telegraph and bridge companies and other corporations, and to contractors and individuals." The capital stock is to be \$1,000,000 liable to be increased to \$10,000,000.

Another incorporation of a national character which is asking, and will, doubtless, obtain a Connecticut charter, is a Rapid Construction Company, having among its incorporators Marshall Jewell, Alexander H. Rice, Benjamin H. Bristow, E. S. Converse and Thomas Wallace. The capital stock is \$1,000,000, with power to increase to \$6,000,000, and organization can be made when \$500,000 has been subscribed and \$50,000 paid in. The company is for the purpose of building and operating telegraph and telephone lines, and its incorporators are chiefly interested in the American Rapid Telegraph Company.

A rumor has gained wide circulation within the past few days to the effect that Mr. William H. Vanderbilt was about to organize an opposition telegraph company, with a capital of \$25,000,000, and with Gen. Anson Stager, formerly Vice-President of the Western Union, at its head. There is certainly room for such a concern, with so experienced a head as Gen. Stager, not to speak of many other able officers who have recently resigned from the Western Union, but the rumor is strenuously denied in official quarters. President Gen. of the Western Union, said that he could confidently deny that there was any foundation for the reports, and, on Monday last, Mr. Cornelius Vanderbilt said that if there was any connection between the report that \$25,000,000 has been raised to start a telegraph company and the fact of Mr. William H. Vanderbilt's resignation from the directory of the Western Union telegraph Company, he did not know of it.

Meanwhile the consolidated company has been quietly closing its superfluous offices, the reduction of force falling upon the executive department as heavily as upon the working operators.

Many of the operators in this city, however, have been provided with places in the offices of private bankers, who are very generally leasing wires for their exclusive use to Philadelphia and other near-by cities, and in some instances to the far West.

It is said that a delegation of operators called upon Gen. Eckert last Saturday, and requested him to enlighten them as to his intentions in their regard. He answered in a speech in which he said that undoubtedly he would be compelled to make some reductions, but that good operators need have no fear of remaining long out of places in these times. With this very general information they were obliged to be content.

It is pretty certain now that the American Union main office in this city will remain open for the present, but the Atlantic & Pacific building has already been leased to an insurance company, who will occupy it on the 1st of May.

Some cavalrymen near the Cape of Good Hope were in a heavy thunderstorm. A flash of lightning flung seventeen horses with their riders to the ground, killing ten men and five horses on the spot. Those who were not killed were all seriously injured, and it was long before animation could be restored in the case of seven of the men. All the bits and stirrup-irons were blackened, and many of the men, though personally uninjured, had their clothing rent by the force of the electric discharge.

An Able Paper on the Telegraph Monopoly.

Hon. William M. Springer, M. C., has contributed an article to the *North American Review* on "The Telegraph Monopoly," which, on the whole, makes out a strong case against the consolidation. The following is a synopsis of the article:

In the brief space of thirty years, Mr. Springer begins, the telegraphs of the world have grown to nearly half a million miles of line and more than a million miles of wire, or a length equal to forty circuits of the earth.

In the principal governments of the world, except the United States, the telegraph is a part of the postal system, but in this country private corporations construct and control all telegraph lines. The Western Union Telegraph Company, however, has absorbed other companies, until at this time it has the whole telegraphic system of the United States in its exclusive control, with a few unimportant exceptions.

The distinguished writer then traces the history of the Western Union Company, and its growth, step by step, until its capital stock has reached \$80,000,000. He says that the issuing of scrip or stock dividends has constituted one of the chief features of its corporate management. Scrip dividends have been declared to the amount of over four hundred per cent. of its capital at one time. A careful examination of the history of the company will show that, prior to the recent consolidation, of a capital stock nominally amounting to \$41,000,000, over \$26,000,000 was the product of scrip dividends; the remainder, \$15,000,000, represents the money actually invested. But now a nominal capital of \$80,000,000 has been created, and dividends upon this enormous inflation will be exacted from the business of the country for all time to come. The people are naturally concerned as to what may be their rights in the premises. Judging the future by the past, we have no assurance that watering stock and absorbing rival companies are to cease. If there were any ground for hope that the present consolidation would be the last of its kind, we might with some approximation to exactitude compute the result and the effect upon the future business of the country. Eighty million dollars of stock, upon which future dividends are to be paid of at least eight per centum per annum, would require \$6,400,000 annually to supply the demand. The \$20,000,000 actually invested might, properly managed, earn eight per centum per annum, or \$1,600,000. Hence the profit to be exacted from watered stock by this company amounts to \$4,800,000 every year. This tax, thus levied upon and exacted from the business of this country by the Western Union Company, upon this fictitious stock, is equal to a permanent debt of \$150,000,000 of three per centum Government bonds.

Various means of relief have been suggested; some of them deserve to be carefully considered.

First. The regulation by the States and by the general government of the rates to be charged for the transmission of messages. *Second.* That Congress should authorize the construction of telegraph lines at the government expense to be operated in connection with the Post-office Department, leaving the lines now owned by corporations to be managed by them in their own way. *Third.* That Congress should aid some private corporation, and form a kind of government co-partnership with it, by means of which, without any appropriation of public funds, individual enterprise could be successfully intrusted with the telegraphic business of the country at greatly reduced rates, without the possibility of expense to the government. *Fourth.* Providing for the purchase of existing lines, and their ownership by the Government, and the operation and extension of the system hereafter under exclusive Government control.

With regard to the latter plan, Mr. Springer

thinks that if the necessary appraisal of the property is exorbitant, it will be impossible to get a bill through Congress to pay the companies their price. It must not be assumed that the Government will be under any obligation to purchase the property at the appraised value. If the appraisers should so far forget the responsibilities of their position as to fix the value at an unreasonable amount, the appraisal would only serve to defeat the purchase of existing lines, and the Government might then proceed to establish lines of its own, and the extension of lines could be prosecuted with as great rapidity as the appropriations made by Congress would authorize. This would force the existing companies into competition with the Government lines, and compel them to adjust their rates according to the Government standard.

He then produces figures to demonstrate that a Government telegraphic system can be made self sustaining at rates materially less than those charged by private companies, alleging in this connection that in England, for the ten years of Government control, the receipts have exceeded the expenditures nearly \$10,000,000, not including the value of the service performed for the Government.

With a Government system in this country, we might reasonably expect a reduction of rates to not exceeding twenty cents for twenty words to any part of the United States and the territories, a large increase in the number of offices, and an enormous increase in the number of messages. How long the people will forego such benefits, and permit the exactions and extortion of private companies, remains to be seen. The commercial and social benefits to the people which would immediately follow increased telegraphic communication at reasonable rates, in a country of the vast extent of our own, can scarcely be estimated. The press of the country is especially interested in securing increased facilities for the transmission of news. Under a Government system, private wires might be rented both to the Associated Press, and to newspaper publishers whose business would justify it, at rates which would merely reimburse the Government for the cost of constructing and maintaining the press wires, in connection with other Government wires upon the same lines. Boards of trade could also secure the separate use of wires connecting the principal cities of the Union; and all classes of people, both for social and business purposes, could obtain telegraph facilities at reasonable rates.

In conclusion, he considers the argument against a Government monopoly which points to the appalling power which such a system would give to the Federal Government, and the certainty that the telegraph would then be used as an engine of political oppression. Mr. Springer thinks that these evils could be counteracted by providing a Government system so carefully framed as not only to secure a telegraphic service conducted upon strictly business principles, but also to free the postal service from the control of politicians, and place the whole business under non-partisan management, free from the exigencies of party.

Gray's Harmonic System.

At the regular semi-monthly meeting of the New York Electrical Society, on Wednesday evening, March 16, the society accepted the offer of the trustees of the Cooper Union and agreed in future to meet at the Geographical room of the Cooper Union, on the first and third Thursdays in each month (instead of the first and third Wednesdays as previously decided upon). The Cooper Union very generously gives the society the use of this room two evenings a month at the bare cost of lighting.

The routine business having been disposed of, Mr. F. W. Cushing, who was one of the most active in the organization of the society, delivered an interesting lecture on Gray's Harmonic System, of which the following is a very full synopsis:

Before attempting a description of Gray's Harmonic Telegraph, which, as its name implies, has much to do with the phenomenon of sound, a few words on the simpler laws of acoustics will not be out of place.

If two bodies are brought suddenly together, every ear in the room receives a shock, to which the name of sound is given. The molecules composing the bodies are set into vibration, and the vibrations, acting upon the air with which they are in contact, produce air waves which travel out in all directions and finally reach the ear, producing upon the mind the sensation which we call sound. If a body is caused to vibrate, each vibration sends out an air wave, and a continuous sound, called a tone, is produced. When these vibrations are slow the waves are comparatively far apart, and the tone is a low one. When they are rapid the waves are closer together, and the tone is higher. Every body that can be made to vibrate has its fundamental tone; that is to say, it can move just so fast and no faster. The amplitude of its vibrations may be made greater, but this will only increase the volume of sound without altering the pitch. As an illustration, take a weight suspended by a piece of string. Move it from its position of rest an inch to the right; when it is released it will swing back to and, having received an impetus from the force of gravity, nearly an inch to the left of its original position. Then move it three inches to the right. When released it will swing nearly three inches to the left. Next time start it from a position a foot to the right, and it will swing nearly a foot to the left. Each of these swings of one, three and twelve inches will occupy precisely the same time, and if the string were a solid body with one end fixed and the other vibrating with an amplitude of one, three or twelve inches, the same number of air waves per second would be sent out in each case and the same note produced, but the volume of sound would be greater with the greater amplitudes.

These air waves are not only recognized by the human ear but by any body having the same fundamental tone that they come in contact with and that is free to vibrate. Professor Gray illustrates this by standing two tuning forks of the same tone near each other and causing one to vibrate for a few moments. Upon raising it, the other fork will be found to be vibrating also. The first wave strikes the nearest prong of the second fork and pushes it a little out of place, when its elasticity carries it back to and a little beyond its original position just in time to meet the second wave, when the former operation is repeated and the vibratory motion is sustained as long as the air waves last. If, however, the forks have not the same fundamental tone, the second fork will not vibrate, because when the prong of the second fork is displaced by the first air wave and flies back, the second wave comes along either too soon or too late to take advantage of the motion communicated by its predecessor and its effect is lost. Hence, in order to communicate vibrations from one reed to another by means of air waves, both must be tuned to the same note.

In transmitting vibrations through a wire by means of waves of electricity, these general rules must be observed. At the sending end of the wire a reed is set into vibration, and each of its swings is made to send a wave of electricity over the wire. These waves, reaching the receiving end, pass around the cores of an ordinary electro-magnet which has for an armature another reed with the same fundamental tone as the first one. Each pulsation of current magnetizes the soft iron core, which, in turn, attracts the reed and draws it out of place; then the current is broken, the core is demagnetized and the reed, being set free, flies back to, and on account of its elasticity, a little beyond its position of rest, when it is again attracted by another wave of current and the motion repeats itself as long as the current waves last. If the vibrator at the sending end be thrown in and out of circuit, the reed at the receiving end will start and stop exactly in accordance with it, and telegraphic signals may be transmitted, being received in the form of musical notes, a short note forming a dot and a long one a dash.

A very ingenious device has been invented by Professor Gray to reduce these notes again into Morse characters upon an ordinary sounder. A small bar of metal, called a rider, is balanced upon a supporting piece, and has one end resting upon the receiving reed. A light adjusting spring is attached to the rider. One pole of a local circuit, containing a sounder, is attached to the reed and the other pole to the rider. When

the reed vibrates the rider trembles upon it and makes the connection in the local circuit so poor that the sounder opens; the instant the reed stops vibrating, the adjusting screw pulls the rider firmly down upon it, restores the circuit and the sounder closes. So that when the sending key is open, it being so arranged that the vibrator is then to line, the receiving reed is in motion and the receiving sounder is open; close the sending key, the vibrator is thrown out, the receiving reed becomes quiet and the sounder closes, producing the same effect as in sending over a single wire with ordinary Morse apparatus. It may seem incredible that all these arrangements should work so nicely together as to allow of rapid transmission, but at a recent test of five hours between New York and Boston, 376 messages were actually sent over one tone, being an average of over 75 per hour, and probably the fastest time ever made on a Morse circuit where ordinary business was handled.

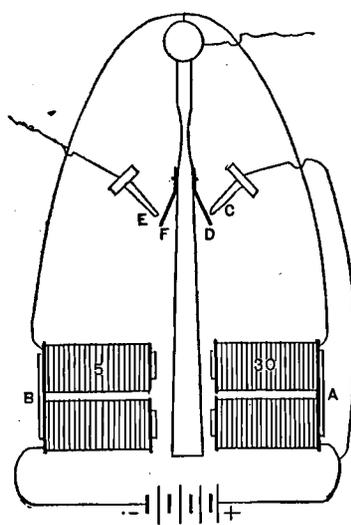
As operated at present, four vibrators with different fundamental tones are placed at the sending end, and four receivers, so tuned that each will equal one of the vibrators in tone at the receiving end of the wire, and the four series of vibrations are transmitted simultaneously, each receiver responding only to its own sender. Thus, we have four messages going in the same direction over one wire, and at the same time. In order to break, resistance is thrown in and out by the opening and closing of a key at the receiving end, which throws a relay that has been adjusted over the tone current at the opposite end out of adjustment and records the signals. All the receiving operators use the same break key without confusion.

Professor Gray has transmitted as many as eight tones at once, but the margin between them was so small and such very delicate adjustment was necessary that, for practical work, he adopted four tones only, and so developed the principle into the present Harmonic System.

The following diagrams and explanations will assist the reader in more thoroughly understanding the principle of the Harmonic System:

THE VIBRATOR.

The electro-magnets, A and B, have coils of 30 and 5 ohms of resistance, respectively. When the current leaves + pole of the battery and magnetizes A, the reed is drawn to the right and closes the contact points, C D. The current is then shunted around A, increasing the power of B, and the reed is drawn to the left, closing the contact points, E F—which are arranged to send a wave of current to the line at each contact—



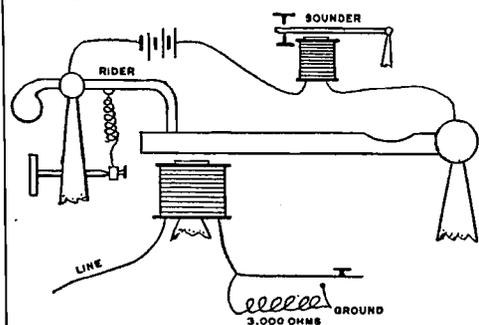
when the former action is repeated and the reed is in a state of vibration. The speed of the vibrations is governed by the fundamental of the reed.

RECEIVING APPARATUS.

When the reed in the receiving relay is in a state of vibration, caused by the action of the incoming waves of current, the local circuit, in which is included the reed and rider, becomes so imperfect (caused by the rider's trembling) that the sounder opens. When the reed returns to a

state of rest the contact becomes perfect and the sounder closes.

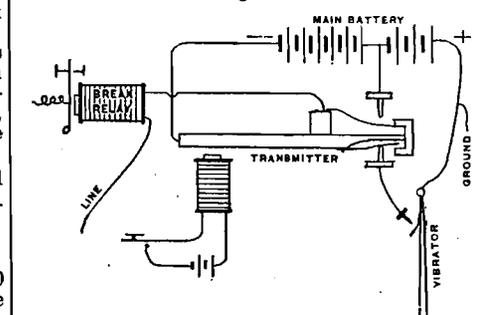
The break key, when not in use, is left open, forcing the current to travel through about 3,000



ohms of resistance (or more, according to the length of the line) to find a ground. When the key is depressed, the current takes a new route of no resistance to ground, and the current is sufficiently increased, by having so much less resistance to encounter, that the magnet of the break relay, at the sending station, overcomes the tension of its armature spring and closes, recording the signals made upon the key at the receiving station.

SENDING APPARATUS.

When the reed swings to the left the battery is short-circuited through the transmitter lever,



lower spring and contact points. When to the right the metallic circuit is broken and + pole finds ground at the home, and - pole through the line at the distant station. Instead of actually opening and closing the battery, the action of the vibrator only reduces its strength about 60 per cent., and, as it is necessary that the same amount of current should always be to line to allow of the break relays being adjusted over it, the points are so arranged that when the transmitter is closed, cutting off the vibrator, the upper spring and point come into contact and throw about 40 per cent. of steady current to line. So that, whether the key be open or closed, the same battery strength is always going to line. When the key is open it is being sent in pulsations (too close together to affect a Morse relay), and when the key is closed it is being sent steadily.

New Publications.

THE BOSTON TELEGRAM.

New England is to be congratulated upon the possession, at last, of a representative telegraphic journal; the only wonder being that, as nearly every other section of our great country has essayed such a publication, Boston—of all places in the world—should have hesitated so long. In a profession like ours, which embraces so much that is intellectual and refined, there is need for some easy method of intercommunication and some cheap vehicle for the general diffusion of electrical knowledge. This has been apparent from the multiplicity of telegraphic journals which have literally "broken out" from time to time all over the country, and which have failed only from a lack of money; thus proving that, from the earliest days of the telegraph, our professional thought has been struggling for expression, while our professional income has not been

ample enough to admit of more than one oracle at a time. As, to use an old illustration, the children of Israel sang the songs of their captivity by the waters of Babylon, and embalmed their history in verse and melody; as the wandering troubadour, at a later date, spread the news from village to village, to the accompaniment of a lute, so have we in modern times sought to record our sorrows and joys, our triumphs and defeats, and our wonderful progress, for the enlightenment and guidance of those who may come after us. The result has been a series of class papers, excellent in themselves; but, to speak by the record, wofully disastrous to their originators.

In olden times—if we may use that expression in connection with so modern an affair as the telegraph—nearly every practical worker had a conviction away down in his telegraphic soul that he could edit a professional newspaper, providing that he could, as Trollope says, command a table and chair, a box of pens and ream or two of paper. The writing of the matter to be published was all right, but it was speedily found that "writing" checks to pay the printer's bill and the stationer's bill was where the real pinch came in. This kind of experience developed the remarkable theory that, as a rule, it took at least three men to run a telegraphic paper—one to do the writing and editing, one to owe all the money, and a third to wind up its affairs. The last named, being the undertaker, by virtue of his high office, is the final and sole representative; number one usually dying exceedingly young, and number two generally emigrating to some distant clime where sheriff's writs are unknown.

But in later years there came a change, and telegraphers demanded reading matter which had something more than the dry legal precision, soberness and monotony of an extended affidavit. The light and springy Jefferson Bricks of the telegraph—to borrow an appropriate name from that insufferable snob and toady, Charles Dickens—found their occupation gone. As might be expected, the demand brought forth an ample supply, and such cultured and entertaining writers as James D. Reid, James N. Ashley, Frank L. Pope, Fred. Grace and Ralph W. Pope, came upon the literary field—men who realized fully that the day had passed when, as with the old system of mining, a man could profit by bringing the ore to market fresh from the mines—gold, mud, rock and all—shoveling it in pell-mell. The profession demanded that the dross be well sifted. It was found necessary to keep the ever-changing record of events as the geographer and explorer traces and maps out for future travelers the course of a river. The fact was recognized that a first-class telegraphic paper could not be made by one man, and that it must be the work of an organization as complete and thorough in its way as a great telegraph company, with its ramifications extending all over and far beyond the continent; that many busy hands and heads must be forever working, collecting, arranging and publishing our contemporary history; formulating and analyzing it, and generalizing upon it; that the successful editor must never be wrong in his data; that he must possess matured powers, a subtle perception of the needs and necessities of the craft, and a wide knowledge of mankind in general; and that it must all be presented in graceful diction. In answer to this popular craving for a suitable outlet for our overflowing thoughts, New York, Philadelphia, Chicago, Cincinnati, St. Louis and Bolivar (Tenn.) have all issued telegraphic papers from time to time. All have lived their day, written their names in sand and passed away, and of all of them only THE OPERATOR, now in its green old age, remains. Now, since the various sections of the country just mentioned have been duly interested, in a journalistic sense, it is only fair that New Eng-

land should make her maiden effort, which she has lately done, and done well, as she does everything else. The name of the new journal is the *Boston Telegram*.

Its initial number, dated March 1, although it appeared three weeks behind time, and much of its matter was dated January and February—fully comes up otherwise to all the requirements of a first-class telegraphic journal. It is to be published semi-monthly by the Noble Brothers, one of whom—Thomas C. Noble, Jr.—is a well-known writer; and it is edited by Mr. Joseph Nash. The reading matter, albeit a trifle old, is in the best taste, and its typographical appearance is good. The Intelligent Compositors' errors, which occur on almost every page, are excusable, inasmuch as there is positively no remedy and no redress; but it is unfortunate that twice in the same article the *Telegram* should speak of "Greil" Eckert, a double dose of an outlandish appellation which will be anything but pleasing to the ex-assistant Secretary of War and the General Eckert who at present holds the telegraphs of America in the hollow of his hand. We hope that "Chops," the *alter ego* of the *Telegram*, will see to it that "Greil" Eckert is treated with more respect.

The *Telegram* is an injection into our peculiar literature, rather than an outgrowth of the same; still, we are glad to see it, since it must arouse all our dormant diligence and energy, and keep us up to the necessary point of extreme accuracy and enterprise; although its extravagant price—ten cents—may militate against its chances of success, and thus by its failure deprive us at an early stage in the proceedings of an incentive to out-do ourselves.

Our Eastern friends have undertaken a great responsibility, and we hope to see them acquit themselves in a manner creditable to American telegraphers. They have sought to create an instrument of tremendous power for good or evil; but it is a two-edged sword. They will have to learn how to guard against the protean axe-grinder, and, at the same time, to accord full honor where honor is due, while the journal must never be used as a vehicle for personalities dictated by private bickerings. They must consecrate body and brain to it and work like slaves for a small recompense, and under such circumstances we predict for them the simple word Success. When that goal is attained their income will be barely as large as William H. Vanderbilt's, or as varied as Jay Gould's, but they will have the proud consciousness of a great work grandly done. We wish the new journal much success. The address is Noble Brothers, Publishers, No. 79 Milk street, Boston, Mass. Subscription price, \$2 per annum.

Sparks from the Elevated.

There are employed by the Manhattan R. R. Co. of this city 183 telegraph operators, divided as follows: 20 on the 2d Ave. L.; 53 on the 3d; 40 on the 6th, and 20 on the 9th. Most of them act as ticket agents as well as operators. They are, as a rule, a good class of operators, although having little telegraphic work to perform. Their hours of duty are long and arduous, being from 11 to 15 hours per day, for which they receive the small compensation of from \$1.75 to \$2.35 per day. Our idea would be to diminish the hours and extend the pay.

We note the following changes: 2d Ave. Line.—Mr. P. J. Dunham, transferred from 1st st. South to 65th st. North, and Mr. J. Charlton from 65th st. North to 1st st. South; Mr. J. A. Chadwick, formerly night agent and operator at Franklin Square, resigned March 15. Mr. W. H. Cass, formerly employed as operator on the Northern Central of N. J., takes Mr. Chadwick's place.

3d Ave. Line.—Mr. W. H. Mayer, formerly night agent and operator at 76th st., resigned and goes westward. Mr. F. W. Woehrl, formerly with the N. Y. C. R. R., has been assigned to fill the vacancy.

Mr. A. M. Lane, formerly agent and operator at 125th st., started for Peoria, Ill., on the 23d inst., to take a position on the Peoria & Pekin Union R. R.

Mr. J. P. Cole, formerly agent and operator at Grand st., has been transferred to Grand Central Depot station, morning tour. Mr. Wm. E. Waugh

R. R., located at Metuchen, N. J. 6th Ave. Line.—Operator and Train Clerk Mr. J. R. Dickerson, of Rector st., resigned on the 15th ult., and has accepted a position as operator with the W. U. in Jersey City. Mr. W. E. Sperling, formerly of the P. R. R., has been assigned to the vacancy. Mr. C. W. Jackson, formerly operator in train master's office, 129th st., has been appointed chief time clerk of the Transportation Department of this company. C. H. Stebbins, formerly with the N. Y. & N. E. R. R., has accepted a position with this company, and assumes his duties to-day, April 1st. Mr. Wm. M. Hoag, formerly with the N. Y. C. R. R., has recently accepted a position with this company, and has been assigned to the extra list. Mr. Henry S. Smith, who is now employed as operator in the train master's office at 129th st., is again making his usually good copy. Mr. Smith (until his recent appointment) had been out of the business for seven years. Mr. S. S. Ketchum, formerly with the W. U., this city, is occupying a position as operator in Supt. Green's office, No. 4 Front st. Mr. W. S. June, formerly operator and ticket agent at 34th st., East River, is now filling a position in Supt. Green's office. We are sorry to hear that Mr. M. E. Wines, agent and operator at 14th st. and 3d ave., is quite ill, having been confined to his room by a severe attack of rheumatism.

Improvement in Telephone and Telegraph Lines.

Mr. T. G. Ellsworth, manager of the John street office of the Metropolitan Telephone and Telegraph Company, New York City, has invented an elevated support for telegraph and telephone wires in large cities. From the annexed engraving—for the use of which we are indebted to the *Scientific American*—it will be clearly seen that everything possible has been done to remove all objectionable features, and to add to it a combination of many useful and improved appliances which tend to make the whole structure ornamental to the streets.

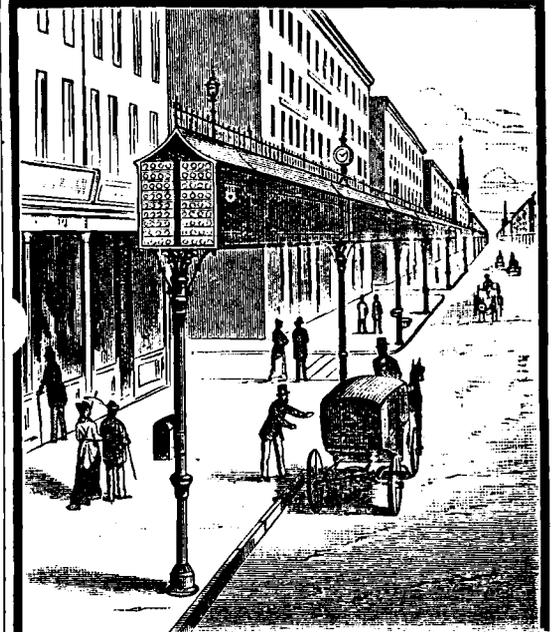
Telegraph wires are fast becoming objectionable to the public, on account of the unsightly poles on the streets and the awkward fixtures on the house-tops; the space they occupy and the cost of construction and maintenance on the part of the different companies, is becoming burdensome.

Since the telephone has been so universally adopted, the wires in many localities form a perfect network. Interruptions have occurred, at the most important part of the day, on thirty or more lines by the breaking of a single wire. The great value of telegraphic and telephonic communication lies in uninterrupted service, and any means that will insure this and cheapen the present rates will increase both the number of telegraph messages and telephone subscribers.

The particular tube shown in the engraving has been selected from many desirable forms to illustrate this invention. Inside the tube are arranged a number of shelves for supporting the cables, which are marked at a suitable distance by the number of each being woven in the covering. At each street crossing is located an electric light, its support being a part of the structure. At proper distances are letter boxes arranged for the attachment of a pneumatic tube for collecting the letters, or they may be collected in the usual way by carriers. Electric clocks are located at desired points, indicating London, Paris, China and New York time. Police time detectors form a part of this system, each policeman to signal to the station at intervals while on beat. By this arrangement a patrolman is in constant communication with the station. Fire-alarm boxes are placed at suitable distances in combination with the improved system. Ambulance boxes are also provided for signaling ambulances, etc. Drinking fountains and the like are distributed at different points. These attachments constitute some of the uses which can be made of the structure. The columns, being hollow, admit of cables passing unseen underground to buildings wherever desired, or special tubes can be arranged for conveyance above ground.

Mr. Ellsworth, the inventor of the above system, was engaged for eight years prior to 1872 in the manufacture of all kinds of telegraph in-

struments. During the great storm of 1874 he was an inspector in the Gold and Stock Telegraph Company, of which General Marshal Leferts was President, and was in charge of line-

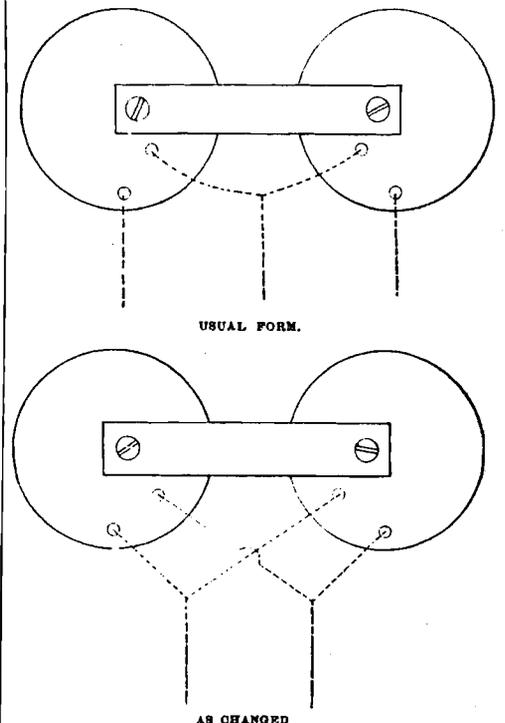


men rebuilding the wires in his district. This invention seems to be one that has suggested itself after a long and varied experience in dealing with city lines.

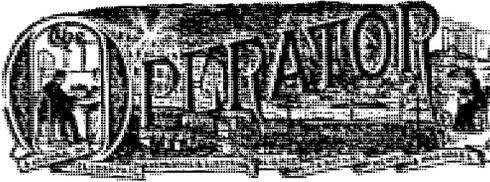
A Simple Experiment.

To the Editor of The Operator:

Sir: It sometimes happens that young experimenters find that a magnet of high resistance (fine wire) will not work in the particular circuit in which they are trying it. There is a very easy way to make it work; namely, to reduce its resistance one-half. The manner of doing this may be of interest enough to show to the readers of your valuable paper:



I. H. FARNHAM, Managing Electrician Bell Telephone Co. PORTLAND, Maine, March 8, 1881.



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Subscribers desiring their addresses changed, should give the old as well as the new address.

NOTICE.

Our representative, MR. J. R. CALDER, expects to leave New York for Chicago to-morrow evening, April 2, on the business of this paper. In addition to representing THE OPERATOR at the Telephone Convention, Mr. Calder will also during the trip look after our interests among telegraphers and others, in the matter of both subscriptions and advertisements.

THE COURSE OF THE OPERATOR.

Several of our esteemed correspondents have recently complained, in a rather oracular manner, of the moderate tone pervading our reports of the Consolidation, and one particularly censorious friend flippantly inquires if we have "sold out" to the Western Union. The latter absurdity requires no reply. We have occasionally explained that this journal always was and is now endeavoring to reflect, and not to shape or lead, the intelligent and popular opinion of the telegraphic profession. The record of THE OPERATOR must prove this. We have struck at frauds and shams wherever found; we have praised where praise was warrantable; we have opposed oppression until relief came to the oppressed; we have surrendered unlimited space to the widow and the orphan when their cause needed ventilating, and we have bitterly opposed Monopoly until opposition was no longer effective, and remonstrance, being useless, was in danger of descending to the level of rank abuse. We have endeavored to exemplify the operator himself, in the possession of the great common sense qualities—"the courage to fight, the grace to yield or the sense to run away"—each in its proper place. We have deemed it the limit of our duty to find out the truth, and to place it before our readers in a clear and truthful manner, leaving them to draw their own conclusions. This much we have done faithfully and with extreme caution, and by night and by day, with the deepest sense of loyalty and responsibility. That this course has been a true reflex of the thought, opinions and wishes of the vast majority of our intellectual fraternity, we have no reason to doubt. We should not be expected to consider seriously complaints of a purely selfish or emotional nature, written in a petulant spirit, nor to model the operators' organ upon any erratic programme exuded from the glowing fancies of men whose minds are induced

at present by the most powerful incentives to be selfish and unreasonable.

We never lose sight of the established fact that telegraph companies generally are not given to any such amiable weakness as inquiring strictly into the morality of any new scheme which might bring money into their coffers. But when we have it from the highest authority that sweeping reforms are to be inaugurated, and that an era of good will and prosperity is at hand, are we to refuse to do our share toward promoting that end? May we not suspend criticism for a reasonable time, and ascertain definitely whether we are clutching at ropes of sand or not? Our great telegraph bosses, healthy and wealthy, though perhaps not over-wise, appear to have cared very little hitherto for the opinions of the great mass of operators; but they may have read lately of the Roman victor in his chariot, driving over the prostrate bodies of his foes, who was always accompanied by a slave to whisper continually in his ear that he, too, was mortal. Maybe our modern Conquerors were about to listen, and since we know that they are encouraging moderate and fair discussion, why should we not, for a time at least, ride in the chariot with them and whisper the good word?

Times are changing. We have at the present time the rapid building of new lines, the multiplying of the capacity of the old lines by recent inventions and the steady increase in traffic, all finding work for more operators. It may be borne in mind with advantage that all men are not gifted with practical minds, and many are therefore unable to appreciate or make allowance for the many difficulties which present themselves in the government of a great enterprise. Reforms need time, great patience and forbearance on the part of all concerned and gradually liberal methods. All good things cannot be obtained in a day. That is a good doctrine which teaches us to treat all our enemies as if they might one day be friends, and all our friends as if they might one day be enemies. A kind word goes a long way; it is the curse that makes the chasm. Of all men in the world, telegraph operators can least afford to encourage the outrageous doctrine that "they should take who have the power, and they should keep who can."

If, then, THE OPERATOR has not truly reflected the sentiment of the majority of our profession, we should like to hear from our brethren on that point. Meanwhile, THE OPERATOR will do nothing to mar a good understanding between employer and employé, never forgetting that the more fruitful we make the ground in the Spring the greater will be the harvest in the Autumn. We believe that dissension can do no good at present, and that the best interests of the profession are to be served now by patience and toleration, counseled by operators ripe in sober manhood; a due respect for vested rights and a strict observance of the ordinary rules of fair play. The Consolidation is inevitable—we can't kick against that—and, if there is anything in human promises, the lot of operators ought to be no worse through it.

THE 10th inst. is an anniversary which, like that of the Battle of New Orleans, teaches what a great advantage the telegraph is as a life-saving power in war time. Sixty-seven years ago, March 30, 1814, Paris capitulated, and on the following day the allied armies entered the city; Bonaparte announced his willingness to abdicate

and retired to Fontainebleau; a provisional government was established, with Talleyrand at its head; and, in short, the Napoleonic wars were at an end—or should have been. But there was no telegraph in those days to carry the news instantly to the vast opposing armies in the South, so that they remained in ignorance of the turn of events, and ten days afterward—Easter Sunday, April 10, 1814—while the mounted couriers were still speeding toward the Spanish frontier, there came the shock of battle between the armies under Soult and Wellington, and 10,000—the French say 20,000—men were unnecessarily slain on the field of Toulouse. Nowadays, when the world is meshed with a million miles of telegraph wire, there can be no useless battle fought weeks after peace has been declared.

On the other hand it may be possible that the telegraph has its drawbacks. Mr. Charles Francis Adams has said that if there had been a telegraph cable under the Atlantic Ocean in 1863 war between the United States and England would have been inevitable. After the Federal marines had boarded the English steamer *Trent* and taken off the Confederate commissioners, and Lord Palmerston had sent the Guards to Canada with their bands playing "I'm off to Charleston," the interval of twenty days necessary to get a dispatch from Washington to London and return gave time for the heated passions of both nations to cool and for salutary reflections on both sides.

ABOUT four years ago this journal published a brief account, written by "Werner," of a West Philadelphia superintendent being struck by lightning; of the bolt having taken him squarely on the head, knocking him down, and of his subsequently explaining apologetically that he had been sick for two weeks, else he would not have displayed so much weakness. It was an English journal that copied that paragraph in all earnestness, characterizing it as "wonderful tenacity of life." This may explain why our esteemed scientific contemporary, the *Electrician*, in reviewing "Tales and History," is lost in Cimmerian darkness with regard to the humor therein; and, while our able contemporary is good enough to acknowledge much merit in the work, it cannot refrain from observing in its own Addisonian style that "we stolid Britains are sometimes inclined to wonder at the ease with which our cousins allow themselves to be amused." We have a great deal of respect generally for the flag that has braved a thousand years, the battle and the breeze, and much admiration for the enterprise and tact displayed by the *Electrician* in particular; but when it comes down to appreciating the fine point of a random joke, we must say that it requires a copious supply of explanatory footnotes to satisfy our jolly cousins. To aid in a better appreciation of the work, we reprint to-day two intelligent opinions of the "funny" part of "Tales and History"—one from the New York *Sun*, representing the most critical and widely circulated daily paper on this continent, and the other from the London *Design and Work*, representing the brains of England—or as little of it as is not engaged in editing the *Electrician*.

THE article by Congressman William M. Springer, of which we reprint a full synopsis on another page, is as elaborate and able a showing as can be made against the present telegraphic monopoly, and is well worthy of the attention of our readers. Mr. Springer's statement of the wholesale manner in which Western Union

stock has been "watered," and the tremendous tax on the business interests of the country which will be necessary to pay a dividend of eight per cent. on the increased capital, is a striking one; although his estimate of the present value of the telegraphic plant (\$20,000,000) is far too low, when we consider the right of way and other privileges bought and paid for, and the quadruplex, Page and other patents held by the Western Union. We rather regret that so eminent a statesman should descend to such common stock phrases as "corporate greed," in speaking of the natural race for wealth inherent in our people, and that he should complain in a communistic spirit that "two of the directors of the (W. U.) company are reputed to be worth two hundred million dollars"—a fact which can concern no honest man, except, possibly, the expectant heirs of the directors in question. Mr. Springer is solid on the postal telegraphy scheme, so far as its removal from political influence is concerned, and if it were possible to have a government monopoly based upon his idea we can see very little cause for regret at parting with an evidently odious private monopoly. We are sorry that we have not the space to reprint Mr. Springer's article in full.

THERE is a paper published in Ohio, in the interest of a certain telegraph "college," and, as the greater part of its admirable reading matter is clipped bodily from THE OPERATOR, it presents a very fine appearance. But in that part of its news which is not clipped from THE OPERATOR there is a wonderful absence of grammar and truth. In the latter respect we have to object to its sweeping statement that the salaries paid to operators vary from \$40 to \$125 per month; that "the salaries east of the Mississippi River, for night operators in intermediate offices, range from \$40 to \$65 per month, for day operators \$60 to \$75 per month, and that west of the Mississippi the salaries paid are from \$65 to \$80 and \$90 for intermediate offices, the operator in many cases getting the agency for tickets, express companies, etc." If this amateur editor desired to be fair with the students of his college, he would give a correct average of the salaries paid. The Pennsylvania Railroad pays its operators \$20 per month. The United States Government pays firemen in the navy \$20.50 per month. Now, there is an item which, if copied in the *Reporter*, would read like "blank verse" to the simple students at the Oberlin Telegraph College.

We have a warm word of welcome for the new telegraphic paper, the *Boston Telegram*, published by the Noble Brothers, and which is noticed at greater length in another column. It is an excellent representative of American telegraphic journalism; and, hailing from New England, should speedily make a place for itself in the telegraphic world. Our youthful contemporary will soon discover that the history of telegraphic journalism is full of the misfortunes of and contumely heaped upon its ablest writers and thinkers, but having voluntarily assumed the duty of championing the rights of worthy operators, and of holding the baser element in check, we hope to see our sprightly junior contemporary stand to that duty as the soldier stands to his guns. We promise it our heartiest co-operation in anything looking to the advancement of our profession and hope, for the credit of American telegraphers, to see it maintain the high literary ability of which its initial number gives evidence.

It gives us great pleasure to announce that the amount of the Boyce fund (\$902.69) has been paid to Mrs. Amanda M. Boyce, the widow of the deceased, after a long, weary wait of nearly four years. We take it also as a compliment to THE OPERATOR, since the "managers" of the T. M. B. A., after twice procuring the rejection of the claim, had, two years ago, come out strong for a voluntary payment, and exhausted their energy when the sum of forty-one dollars was raised. Some of those managers have steadily opposed any payment since, and we were pained to observe that our esteemed contemporary, the *Journal of the Telegraph*, did no more than mention the matter in a gingerly manner. When telegraphers owe one thousand dollars, you will not find them offering forty-one dollars, if the matter is properly laid before them. We congratulate the members of the T. M. B. A. on this little act of justice to the family of a dead brother.

It is scarcely fair for Mr. Springer, in his excellent monograph on the Telegraph Monopoly, to take so much pains to show that the average cost of a message in England is only 25 cents, while it is 88 cents in the United States. England is barely larger than the State of Pennsylvania, while our system of telegraphs, in reaching across the continent, traverses 50 degrees of longitude, or about as far as from London to Teheran, in Persia; and, north and south, through 15 degrees of latitude, or as far as from the most southerly part of England to the Arctic circle. From New York to Omaha, which is not half way across the continent, it is further than from London to Rome; so that, in making comparisons, it would only be fair to compare the average rate on a message in the United States with the average rate on a message to any part of Europe, from Ireland to the Ural Mountains, and from the Mediterranean to Archangel.

It seems latterly that no great soul-stirring event can be complete without the ubiquitous telegraph operator coming prominently to the fore. It will be remembered that during the Electoral Commission excitement in 1876-7 one of the chief pacificators was Major E. A. Burke, an old operator from Texas. All eyes are now turned toward South Africa, and here again we find our professional brother acting as chief adviser. Alfred Aylward, a kind of Prime Minister and military counsellor to General Joubert, the great Boer commander, has been recognized as a telegraph operator who was formerly employed at Dublin. Hard luck seems to squeeze the telegraphers pretty tight occasionally, but you hear from them again, sooner or later.

PUTTING up telegraph lines in Senegal appears to be a trifle more hazardous than it was in New Jersey in the palmy days of the American Union, if a recent cable dispatch is correct. The French soldiers built that line to Fouta-Jallon, though with a loss of four officers and nine men killed and nine wounded. The natives, who were probably all armed with Western Union saws, lost an even hundred killed and wounded. If the English telegraphers—the Royal Engineers Telegraph Train—which sailed for Natal recently in the steamer *France*, do half as well in Natal as the French have done in Senegal, the telegraph will be greatly extended in South Africa.

THERE is something so generous, so chivalric, and, withal, so modest, in the private character of Mr. P. J. McMahon that no one can quarrel with the selection for Our National Portrait Gallery for this issue. In his professional capacity

he is too well and favorably known under the pseudonym of "Paddy Mack"—one of those easily mouth'd titles so freely bestowed by irreverent operators on their favorites—to need indorsement by us. Mr. McMahon is a fair example of the vigor and talent which are so rapidly bringing American telegraphy in advance of all the world.

THAT was a mournful story narrated to the Philadelphia Councils last week during a discussion over certain rights to be accorded to "opposition" telegraph companies. It was clearly shown that no less than nineteen telegraph companies have been successively authorized to run wires in that city, each promising a determined competition with the Western Union, and that one after another of these nineteen companies have fallen by the way-side and "consolidated," though their wires still remain.

THE misanthrope who likes to contemplate sad news may find it in our "Personals" to-day. The brief items cover a long tale of mistaken zeal, hard luck and lost hope. THE OPERATOR has nothing but its sincere regrets to offer to the old warriors struck down in the trenches where they have fought so long and so gallantly. To the man who has literally hewn his way through the world, it is hard to be turned back and to commence his excavations again, but to a strong arm and a stout heart there is little, however appalling it may appear, that is utterly impossible.

WE have to return our thanks to the telegraphers of Philadelphia for the cordial manner in which our representative, Mr. J. R. Calder, has been received in their city, and for their great interest in THE OPERATOR, which is evinced in the prompt and cheerful manner in which nearly every operator and telephone man in the good old Quaker City has supported the representative paper of our profession.

AS Gray's Harmonic System is just now attracting much attention, by reason of the recent practical experiments with it between New York and Boston, Mr. Cushing's lecture, printed in this issue, deserves careful perusal. The cuts to accompany the lecture, as published, were prepared especially for THE OPERATOR, and are the first that have been made or published of the Harmonic System in its present perfection.

IN this issue Messrs. J. H. Bunnell & Co. present a new and interesting page of cuts and descriptions of very handsome combination sets, made up of giant sounders, steel lever keys, sounding relays, etc., adapted for lines from a few feet to 600 miles in length. The prices are remarkably low, while the quality of the instruments is strictly first-class.

THE Chief Signal Officer is to be congratulated upon the efficiency of his bureau, which now feels confident enough to issue two-day forecasts of the weather. The Signal Service is steadily progressing.

OUR telephonic friends, and those interested in the telephone, should not forget that the telephone convention takes place in Chicago on Tuesday next, April 5.

WESTERN UNION stock is quoted at 118½; A. & P. at 47½, and American Union not quoted. Last issue they were 116½, 48½ and 80½ respectively.

OWING to the large amount of interesting matter received for this issue, we find it necessary to issue a twenty-page paper to-day.

Notes and Queries on Electricity and Electro-Magnetism, and their Applications.

Practical as far as possible;
Theoretical as far as necessary.

BY T. D. L.

Q. 100. What is a magneto-electric machine?

A. A magneto-electric machine may be briefly defined as "a contrivance whereby motion is transformed into electricity." They are made in many different forms, and the modifications of the machine are almost as numerous as are those of the voltaic battery. Nearly all may, however, be comprehended in three classes:

First. Those in which the working current is generated by the movement of coils of wire in the vicinity of permanent magnets.

Second. Those in which a comparatively small permanent magnet and armature are made to generate a current which is merely made use of to excite a very large electro-magnet. This is then used to induce a second current, which can be as much stronger than the first as the electro-magnet is more powerful than the permanent magnet.

Third. Those in which the small amount of residual magnetism always present in electro-magnets is utilized to generate a current, which is first used to increase the magnetism of its inducing magnet and thereby its own strength. When the current reaches the required point of strength, a portion is shunted off for use, while another portion may be directed continuously through the coils of the inducing magnet, thereby maintaining its magnetism. The Gramme machine, however, differs in principle from all others, and will be specially described.

Q. 101. Describe a machine of the first class mentioned.

A. This class of machine is the simplest, and was long the only style in use. A pair of coils of insulated wire, containing soft iron cores connected by a yoke piece (the coils also being connected the same as an electro-magnet), are fixed on a horizontal axis and rapidly revolved in front of the poles of a permanent magnet or series of magnets. The rapid alternate approach and retreat of the coils through the magnetic field of the permanent magnet induces currents in each coil, but in opposite directions.

The wires of the coils must, therefore, be connected together and to the terminal in such a way as to cause the currents in one coil to flow in the same direction and time as the currents induced in the other.

When so connected the coils act with each other, and the combined current is reversed but twice in each revolution. For some purposes, such as ringing bells, these reversed currents are used just as they come from the machine; but if the current is required to be continuous, and to flow in the same direction constantly, as it necessarily must when used for lighting and similar purposes, an arrangement called a pole changer or commutator is attached to the axis of rotation and to the terminals of the coils, which brings both currents into the same direction. These latter remarks refer to all magnets or dynamo machines except the Gramme. That machine, by its peculiar construction, furnishes a constant current in one direction.

Q. 102. What was the first improvement in magneto-machines after the invention of the machine described above?

A. The invention of the Siemens armature. It was proposed in 1857 by Dr. Werner Siemens, and consists of a cylindrical piece of soft iron hollowed out at two sides for the reception of insulated wire wound longitudinally or parallel to its axis. This is fixed on bearings in a magnet cylinder formed by the extension of the poles of the permanent or electro-magnet, which are joined together by brass or copper strips.

The Siemens armature is rapidly revolved within this chamber, and, from its position directly between the poles of the magnet, where the magnetic field is much more intense than in that occupied by the old form of armature, much more powerful currents are produced. The terminals of the wire wound round the armature are led out of the chamber and convey the current to its desired destination.

Q. 103. Describe a machine of the second class, which illustrates the second great improvement.

A. The machine which may be regarded as the

type of the second class is that of Mr. Henry Wilde, of Manchester, England, who discovered that if the current produced by the revolving armature of a permanent magnet was made to flow through the coils of an electro-magnet, a degree of magnetism much stronger than that of the original magnet was produced by revolving the armature sufficiently fast.

Having made this discovery, it then occurred to him that an electro-magnet so excited might be used to evolve a proportionately large amount of electricity. Making a machine embodying the principle, he discovered that such was the case. The following is a description of the Wilde machine, as patented by him in 1867. A very large electro-magnet of the horseshoe pattern forms the lower and much larger part of the machine, and is fixed with its poles downward. The yoke piece joining the two electro-magnet cores is utilized as a base whereon to place a series of permanent magnets, also with the poles downward.

The permanent magnets are much smaller than the electro-magnet. Both magnets are provided with Siemens armatures, which are rapidly revolved simultaneously by the same power. The armatures rotate in what is called the magnet cylinder.

This is formed by masses of iron attached to the poles of the magnets and kept separate from each other by a brass or copper plate. These are bored out to make a cylindrical cavity.

The upper armature is rotated with a velocity of about 2,400 revolutions per minute, and the current thereby obtained is directed through the coils of the electro-magnet below. These currents maintain the electro-magnet in a state of powerful magnetization, and the currents induced in its revolving armature are much more powerful than those of the exciting magneto-machine, and are utilized in the work done external to the machine. With such a machine an iron rod fifteen inches long and one-fourth of an inch thick was melted.

Q. 104. Describe generally the machines of the third class, which include the third great improvement.

A. The principle on which the third class of machines is based was first patented by Varley, and was subsequently re-discovered about the same time by Dr. Werner Siemens and by Sir Charles Wheatstone.

The best and most powerful machines now constructed are made on this principle; for instance, those of Ladd, Tisley, Siemens and Alteneck. The principle is also applicable to the Gramme and Brush machines, which in other respects differ from all other machines.

A description of one of the above-mentioned machines will suffice for all, as the principle of all is the same.

Ladd's machine consists of two parallel electro-magnets. A Siemens armature is placed at each end. They are, however, of different sizes. The smaller one is in circuit with the coils of the electro-magnet, and the larger one furnishes the working current. The two armatures are revolved simultaneously. The current is at first generated in the coils of the smaller armature by the residual magnetism of the electro-magnets. This armature, as it revolves, sends the currents generated in its coils through the coils of the magnet. The magnetism thus increased magnifies the currents induced in the revolving coils, and at the same time develops powerful currents in the larger armature, thus carrying on the principle of mutual accumulation. The current developed in the larger armature is utilized for the purpose desired.

Telegraphic Tales and Telegraphic History.

From the London Design and Work.

In the United States the employes of the telegraph companies exhibit a good fellowship and devotion to their profession which on this side of the Atlantic, if not existent, is at any rate non-obtrusive. This feeling renders the success of a book like the present an absolute certainty, and our only regret in reading it is, that it is not written in a more cosmopolitan spirit, so as to be equally available and interesting to European readers. An English edition would, in our opinion, prove to be a great success, and would involve very little trouble in the preparation, the author having in that case simply to extend the

third chapter, and slightly modify some of the others. Probably in order to assist in the popular attractiveness of the title of the book, the history of the telegraph is relegated to the second place; but within the book itself it occupies, as it should do, the place of honor, and, notwithstanding the side-splitting mirth of some of the tales, it forms by no means the less interesting portion. The author commences with the pre-electric telegraphs, giving instances where, among uncivilized people, telegraphy by sound and by light was employed. * * * The gradual development of the electric telegraph is carefully traced; and while, as might naturally be expected, the author gives full prominence to the valuable achievements of his countrymen, the labors of Europeans have by no means been overlooked. In fact, we have seldom seen so truly an impartial account of the early history of any great industry or science than has been condensed into these pages. The narration of the introduction of telegraphy into the States is of great interest.

We regret that we cannot find space for more than a few extracts from this exceedingly interesting book. * * * A little fun seasons our daily toil, and the author has, in our opinion, done well to intersperse his narrative with many humorous sketches. Special applications of the telegraph are described, such as its employment in war, and for the regulation of railway traffic, and the volume very aptly concludes with a description of the outgrowths of telegraphy, including the electric light, the telephone, and electric railways.

From the New York Sun.

Just now, when the consolidation of the great telegraph lines has attracted so much attention, nothing could be more timely than the popular account of the electric telegraph, published by Mr. W. J. Johnston, under the title of "Telegraphic Tales." The author has chosen an effective and attractive form of exposition, being careful to illustrate the salient features, characteristic incidents, and important improvements of telegraphy by pertinent anecdotes. The result is that the book is decidedly entertaining, while, at the same time, it presents in a systematic and compact form a summary of such technical information as is useful to the general reader, and not unserviceable to the professional operator. It is seldom that a book containing so much substantial and not easily accessible material of a specific kind is commended to a wide audience by a careful and pleasing literary treatment.

In a chapter discussing the duties, qualifications, and acquired dexterities of operators and messengers, the author relates a curious incident which deserves to be noted by physicians and by all students of the phenomena of epilepsy and trance. It appears that in the winter of 1870-71 one of the operators in the Western Union office at Boston had an epileptic fit. His medical attendant spoke to him, clafed him, and made every effort to arouse him, but in vain. Subsequently one of his fellow operators drew a chair up to the bed, and took the patient's hand in his. As he did so he noticed a feeble pressure by the fingers, which pressure presently resolved itself into dots and dashes, faintly communicating to the tactile sense the words, "W-h-a-t d-o-c-t-o-r s-a-y a-b-o-u-t m-e?" Asked whether he could hear what was said to him, the patient signified assent by a slight motion with the tips of his fingers, and the result was that his fellow-operator got from the patient enough dots and dashes to describe his feelings to the physician, who was thus enabled to apply the necessary remedies. It is certain that no other method of communicating was possible under the circumstances, since the sufferer from epilepsy, although he could hear, could neither speak nor move any of his muscles except those situated in the digital extremities, and these only with the faintness requisite in electric communication. We concur with the author in concluding from this incident that not only persons in a trance, but those in a dying condition, would be able, if acquainted with telegraphic characters, to make known their thoughts and feelings long after any other means of communication had become impossible.

The extraordinary acuteness of the tactile sense and the precision of the sensations which it forwards to the brain are strikingly demonstrated by another of these telegraphic tales. It

is well known that what are termed first-class operators read messages, not by means of punctures in strips of paper, which are only meant for tyros, but by sound—that is to say, by the clicks of the instrument noted in connection with the varying lengths of the intervals between the taps. Of course, by practice, an operator's ear is rendered intensely sensitive, until it can catch the faintest vibrations or whisperings of his instrument. It would not be supposed, however, that this method of reading messages would suit a deaf man. Nevertheless, a deaf man can accommodate himself to these circumstances. We are told that an employé of the American Telegraph Company in Washington, although he could not hear, was rated as a first-class operator dealing with sounds. He could send and receive dispatches by the sense of feeling. He placed his leg against that of the instrument table, and read by the slight jarring communicated, revising, so to speak, the text of his sensations by keeping his eye fixed on the motions of the instrument itself. We need not point out the interest which this fact has for the advocates of the theory, according to which all the specific senses observed in the higher animals have been evolved by differentiation from the tactile sense.

One of the most amusing things in this volume is the account of a new device alleged to have been hit upon for applying electricity to railroad purposes. It is a contrivance by which the colored person employed as a porter in sleeping cars can be awakened at every station. Heretofore the somnolent tendencies of this employé have proved insuperable, except through the constant intervention of the steam whistle, to which passengers not unreasonably object. It is said that a Western inventor has adapted electricity to the purpose of an alarm signal, in such a way that the colored employé's usefulness is increased at a trifling cost. A wire runs from a battery placed in the engine, under the cars, and is connected with an electric disk in the cushion of the hind seat of the sleeping car, where the porter is accustomed to repose. At the moment when the engineer rings the bell on approaching a station, his hand lightly touches the battery, the lightning flashes to the electric disk, and a charge of electricity meandering up the spinal column of the African, he is raised toward the roof of the car. When he comes down he is wide awake and ready for business.

The Widow's Mite.

To the Editor of The Operator:

SIR: Please extend through the columns of the operators' journal my heartfelt thanks and the thanks of my children to the telegraphers, one and all, for the noble manner in which they have responded to the call for the voluntary payment of the assessment due on my husband's death, three and a half years ago.

Although I have since met with many cruel rebuffs, I have never lost faith in the honor of my late husband's associates, and always believed that they would pay the claim sooner or later. I have sometimes entertained misgivings, but the payment comes to me at a time when I had been feeling most apprehensive for the future, so that it is doubly welcome.

While thanking the telegraphic fraternity in general, I desire especially to recognize the disinterested kindness and knightly courtesy of a few in particular. I have to thank Mr. Heber C. Robinson, of Philadelphia, for his unwavering support throughout; Mr. J. N. Ashley, Secretary of the Association, for his laborious efforts; Mr. Joseph Christie, of Philadelphia, for the patient and intelligent manner in which he arranged, classified and presented to his fellow-workers the voluminous correspondence bearing upon the case, and Mr. W. J. Johnston, of THE OPERATOR, for his persistency and tact in placing my claim before the public.

To Messrs. James D. Reid and James Merrihew, of New York; J. T. Alleyn, of New Orleans, and William Holmes, of New York, a

minority of the members of the Executive Committee of the T. M. B. A., I return my heartfelt thanks for the unanimity with which they endorsed my just claim. AMANDA M. BOYCE.
MOUNT HOLLY, N. J., March 26, 1881.

Suit Against the American Rapid.

J. M. Baer, an inventor in telegraphy, has begun a suit in the Supreme Court, this city, for an injunction against the American Rapid Telegraph Company. Thomas Wallace, Daniel H. Craig and Horatio G. Angle are made co-defendants in the suit, although Mr. Angle is not hostile to the plaintiff. Mr. Angle has made an affidavit in which he says that he and the three others, either as the owners or the inventors of telegraph patents, agreed to put their patent-rights together and sell them to the so-called American Rapid Telegraph Company. The company was to issue to them therefor substantially all of its 80,000 shares of stock. The directors, however, Mr. Angle avers, never issued to him and to Mr. Baer the stock belonging to them, but watered the stock from \$3,000,000 up to \$10,000,000, and sold some of it for \$40 a share. Mr. Angle charges that the directors have expended only \$2,500,000 in building three wires from Boston to Washington by way of New York, and in purchasing \$400,000 in apparatus; that they are about to extend the lines by connecting Chicago with Philadelphia and New York by means derived from the sale of the watered stock, but without giving to Messrs. Baer and Angle their shares. They ask, therefore, that a receiver be appointed for the company, and that it be enjoined from carrying out the plans proposed. Decision reserved.

Telegraphers' Aid Society Annual Meeting.

The first annual meeting of the Telegraphers' Aid Society was held at the United States Hotel, this city, on Sunday, March 13, and was largely attended. Seven ladies were present.

The reports of the officers show 110 members in good standing and \$419.71 in the treasury, of which \$400 is on deposit in the East River Savings Bank.

The following officers were elected to serve during the next year: President, T. P. Scully; Vice-President, Richmond Smith; Secretary, J. W. Moreland; Treasurer, F. W. Baldwin; Executive Committee, E. C. Cockey, J. B. Sabine, F. W. Cushing, A. T. Creelman, J. K. Calvert, W. B. Waycott, J. W. McLaren; Auditing Committee, Mr. A. S. Downer and Misses K. E. Cummings and F. A. Martin.

A clause was inserted in the constitution limiting the payment of benefits to sick members to six months, but allowing the Executive Committee to extend the limit at their discretion. The amount paid on the death of a member was placed at \$50.

The meeting was harmonious in every respect, and the Society enters on its second year under most favorable auspices.

American Exhibit at the Paris Exhibition.

A telegram from Washington states that the Department of State announces that a commission has been organized to represent the United States at the forthcoming electrical exhibition at Paris. The Assistant Secretary of State will for the present act as honorary commissioner general, and Mr. George Walker, the Consul General at Paris, has been requested to act as Executive Commissioner in that city. Mr. George E. Gouraud and Mr. Charles R. Goodwin have also been appointed honorary commissioners. Every effort will be made to secure a creditable exhibition of American progress in electrical appliances. Intending exhibitors should address applications for information, blank forms, etc., to the Assistant Secretary of State, Washington, D. C. No application for space should be sent in later than April 20 next. As Congress has made no appro-

priation for the representation of the United States at this exhibition, exhibitors will have to bear all their own expenses and ship goods to Paris at their own cost and risk.

Chicago Notes.

To the Editor of The Operator:

SIR: On March 10th General Eckert and son, and Supt. J. J. Dickey paid us a visit. Their mission here is unknown to your correspondent; probably they were on a tour of inspection, and directing the changes about to take place in the closing of the A. U. and A. & P. offices, and the enlargement of the old W. U. office, in order to take in the wires of the defunct.

On March 17th the "service slips" were abolished *Satis, superque* (enough and more than enough), will likely be the substance of many a hearty comment, particularly from managers who have been intensely annoyed in their efforts to reconcile the seeming inconsistencies "on the face of the returns" with the actual condition and needs of the service. It is to be hoped that the questions thus sought to be reached or proven have been satisfactorily confirmed or denied. Many have regarded the advent of the "service slips" as casting an unkind shadow of distrust upon managers and operators generally, causing some thoughtful ones to feel at least a secret revolt, the spirit of which could not at all enhance the effect of an honest, nor restrain the tendencies of a dishonest, purpose. There are, perhaps, better and not more costly ways to assure the purity of official transactions, and also to stimulate the best operators to mightiest efforts. Evidences of confidence and appreciation, liberal acknowledgements of the value of the services of the tried and worthy, and the careful creation and bestowal of honors where honors are due, would doubtless promote a healthier and more thrifty state of affairs for all concerned. The managers of the great mammoth consolidation may not find a more certain means of contributing to the perpetuity of their glory and power than may be brought forth by a wise consideration and study of the human incentives to earnest endeavors.

Transfers from the A. & P. to W. U.: The brothers Brady, Messrs. Wm. Long, Patterson and Morris; from A. U., Mr. Roberts; all to night force. It is reported that both the A. U. and A. & P. offices are to be finally closed on April 1.

Mr. C. S. Alberts is compelled to retire, on account of ill-health, to his home in Indianapolis. R. W. Ledwith, late report operator for the *Inter-Ocean* private line, has been transferred to Washington, D. C., to act in same capacity there. We all regret his leaving us, and our best wishes attend him. Mr. James Bradley, late night chief at Milwaukee, succeeds him here.

We are sorry to report the recent death of the wife of Mr. Maynard Huyck, and also the infant daughter of Mr. S. O. Bracken, Night Chief Operator W. U.

Although some operating and chiefly talent will be thrown out of employment by the general closing up of offices, most of the boys expect, in some way, to find seats with "the old reliable." At any rate, outsiders need not look this way for openings any time in the immediate future. It is not probably, however, that many of our operators of ability will be forced to idleness very long. The spring and summer business booms will, doubtless, create a demand quite as urgent as was that of last year. Many, too, may find an agreeable and profitable change with some of the new railroad companies, particularly in the vast Southwest, rapidly developing in commercial and mining importance, and where young operators might soon discover prospects ahead that would promise much more than a mere listless existence, if not wealth and honors unthought of now. A late report says that the Southern Pacific Railroad will require operators at the rate of thirty a month for some time to come. Let us trust that after all the expected changes, many of us will have gravitated to positions of unusual prosperity and happiness. "There is a tide in the affairs of man," etc.

Closing Up the A. & P.

To the Editor of The Operator:

SIR: At last the A. & P. is dead, and will soon be resting in the family vault at "195," where so

many of its companions are sleeping, while the corner so long known among telegraphers as "145" is in future to be occupied by an insurance company. Among those who are fortunate enough to be transferred, with other valuable property, to the W. U. building are: W. B. Clum, one of the first to connect a telegraph wire into "145," almost 25 years ago. He does not change with the wind, as his long, gray beard will testify. Lant S. Jones, whose hair is growing silvery in the service, shares the same honor. R. Power, after many years with the opposition, together with E. A. Radigan, A. J. Voyer, J. B. Sabine, B. A. Squires, Miss O'Laughlin and Mrs. Fay, *nee* Miss Grant, with others, will probably be retained by the "big company." Those who have already received notices of "possibilities" may also share with their companions, although it cannot be definitely known. Among those who have recently left us are: Miss Minnie Swan, gone to assist in "passing the ckt" with the American Rapid. Miss Mamie Smith joins her.

Mrs. Johnson goes to smile on the brokers. E. L. Marsh, following scripture, goes to do likewise. F. W. Lord has made himself "solid" somewhere, while Geo. S. Williams will go to Troy, N. Y., to watch from afar the gathering mists. T. A. Van Tassel has accepted a position with the Western Union in Newark, N. J., and G. H. Ackerman will talk to us from Paterson, N. J. S. S. Scandian has joined his fortunes with those of the National Associated Press. There seems to be a sense of sorrow pervading all, at the prospect of an early separation, but it is only visible to one who is sharing in the same feeling, and many times in the future as the leaves of memory are turned will be recalled the pleasant seasons enjoyed at "145," where courtesy seemed to go hand in hand with loyalty, and where, from the president down, nothing but good will has been interchanged. We cheer ourselves with the thought that, although an edict may separate us, yet we are still united in one common band of brotherhood which no power under the bended heavens can scatter.

"80" on A. & P.

FESTUS.

145 Broadway, N. Y., March 28, 1881.

Richmond (Ind.) Notes.

To the Editor of *The Operator*:

SIR: The A. & P. and A. U. offices having been closed, all Atlantic and Pacific and American Union wires have been run into the Western Union main office. Richmond can now boast of forty-eight main line wires and one city cable, and has fifteen sets of instruments in constant use. At present the force consists of Z. P. Hotchkiss as manager; C. C. Perry (formerly manager American Union), bookkeeper; E. E. Fulton, operator at main office; G. M. Samuels, operator depot branch office; James Carr, operator at Hoosier Drill Works. W. L. Hibbard, manager telephone, takes C. N. D.'s at Board of Trade. F. W. Samuels has left us to accept a more lucrative position at Indianapolis. Frank has been working here for the last seven or eight years; he is a first-class operator, and Richmond will miss a good man in him. At the P., C. & St. L. Railway office, J. W. Finckle is chief train dispatcher, with J. H. McAlpine, first; T. Reynolds, second, and Col. E. E. Quick, third assistants; John B. Trindle, Bent Boyer and C. C. Longsdorf, day operators; Frank Duel, night operator; W. S. Brewer, Jr., operator P. H. freight-house. At C., R. & C. Railway office, J. W. Lawson is day operator; and Will Glant is the "owl." As G., R. & I. Railway office, John Olds is on duty days, and F. R. Wires nights.

C. H. Hotchkiss (nephew to the W. U. Manager), has started a telegraph "college" in this city. It has been running about six weeks. He started in a flourishing style with five would-be learners, but his class now numbers only three. Mr. H. is advertising for a "few more students to learn operating." A few days since a young fellow (evidently from the country), who was contemplating sacrificing himself for the "Telegraph Institute's" pecuniary benefit, asked me what I thought about it. I told him my valuable advice to him would be to go to school a while longer before he attempted to learn telegraphy, whereupon he very innocently inquired: "Do you have to know anything about telegraphy to be an operator?" "N. M. in."

TELEPHONE DEPARTMENT.

"Buzzing a telephone" is the latest slang phrase.

The telephone has developed an entirely new school of Hello-cution.

Paris proposes to establish a system of police telephonic stations, on the Chicago plan.

Dr. Cornelius Herz claims to be able to entirely discard the principle of magnetism in telephony.

If Adam could have had a telephone in the Garden of Eden, it would have been "Halloo! Eve" the most of the time.

Mr. James Elverson, the publisher of *Saturday Night and Golden Days*, and an old operator, is about to erect a new and magnificent building in Philadelphia.

Mr. E. T. Greenleaf, who had charge of the Metropolitan Telephone Co.'s wires in the uptown district, this city, has resigned, and is now with the Edison Electric Light Co.

The English Post-office Department has warned the Dublin corporation that the proposed erection of the telephone wires in that city will be illegal. At the same time the authorities intimate that they are prepared to do the work.

Mr. J. H. Emerick, Central Office Inspector, Metropolitan Telephone and Telegraph Co., this city, has resigned to accept a position with the Mutual Union Telegraph Co. Mr. J. H. Hingle, Manager Supply Dept., same company, has resigned, and goes with the Mutual District Messenger Company.

Mr. C. H. Walton, formerly manager of the Telephone Exchange, at 82 Nassau street, this city, and more recently of the Exchange, at 97 Spring street, has been transferred to Elizabeth, N. J., as manager of the telephone business and superintendent of the fire alarm telegraph. He and other gentlemen of Elizabeth are about organizing a local telephone company, to control valuable territory in New Jersey. The new company will make Elizabeth their headquarters.

The convention of the National Telephone Exchange Association will be held at the Grand Pacific Hotel, Chicago, commencing Tuesday, April 9. The committee has only been able to arrange for reduced rates of fare by one railroad line, that of the Erie & Chicago. Round trip tickets from New York, via the Erie Railway, can be procured through Mr. M. W. Doran, of the Metropolitan T. & T. Co., at \$25 each. Delegates can also have ordinary rooms at the Grand Pacific Hotel at \$3 per day. The convention will be important from the fact that all standing committees, of whom thirteen were appointed at the Niagara Falls convention, will report at this meeting.

A long series of experiments have been successfully conducted under the patronage of the French government on the telegraphic lines of the State; concluding trials were witnessed, among others, by M. Cochery, Minister of Postal Telegraphy; M. Jules Ferry, Prime Minister; M. Léon Say, President of the Senate; M. Becquerel, and other members of the Academy of Sciences, and other members, senators, deputies and a great number of engineers. One of the most extraordinary experiments was the transmission of speech on a single wire from Tours to Brest, on a wire passing through Paris, the length of which exceeded eight hundred miles. One single Leclanché element was the sole battery in use.

If growth be an indication of business prosperity, the Bell Telephone Exchange in Portland, Me., must be flourishing. Since the present company took charge of the exchange in April last, they have increased the list of subscribers from 170 to 400. The exchange has recently adopted the plan in use in large exchanges, of calling by numbers instead of name. The amount of business done is from 3,000 to 3,500 communications daily. Mr. I. H. Farnham, managing electrician, has charge of the operating room, with Mr. John E. Tierney assistant. The operators are Messrs. Waldron, Smith, Mahoney, Cooper, Folsom, Burnes and Mike Devine, night owl. The ladies' list is Misses Facey, Wiggin and Seevey. It is stated that Mr. Dan Smith has the greatest record in switching.

For a short time past there has been "a telephone difficulty," as the papers term it, down in Washington. The persons whose houses and

places are connected with the telephone exchange complain that the prices are too high even for good service, and that the service has been extremely bad. Gradually, many of these people have grown weary of answering wrong calls, or failing to get responses to their own calls, and of the vexation of spirit which the invention causes by its hitches, delays and jangling errors. On the 21st ult., three hundred of the six hundred subscribers held a meeting and resolved to withdraw their patronage on April 1, and until the company and the association's Executive Committee agree upon a schedule of rates. Another meeting will be held to consider the advisability of removing the wires of the company from all buildings controlled by members. The price of the use of the telephone and the Exchange was before the revolt \$46 a year. The members not only object to the proposed new rates, but also ask that the old rates be reduced. The company asserts that it cannot carry on business at the old rates without loss.

DASHES HERE AND THERE.

Signal service stations are to be established at six points in Alaska.

It is reported that the Russian authorities used an electric battery to extract a full confession from the Czar's assassin.

Since telegraphic messages in Germany have been at the rate of one cent a word they have proved profitable. Before that they were a loss.

A cable dispatch from London says that the cable steamer Faraday, which will be engaged in laying the new Atlantic cable, is under orders to sail at the end of April.

Mr. William H. Vanderbilt, with fifty millions salted away in Government bonds, says he is quite content. Now you're shouting, William; so we would be under similar circumstances.

Dr. Sanford heard so well from his advertisement in our Feb. 15 issue, that he to-day repeats his offer to send a copy of his eighty-page treatise on the liver, prepaid by mail, on application.

The third annual reception and ball of the Erie telegraphers will be held at Paterson, N. J., on Wednesday evening, April 20. The former balls given by the Erie telegraphers have been great successes.

The Standard Silver Company, whose advertisement appears in the present number, is a reliable firm. From a personal examination we can say that the silverware they offer is remarkably good for the price.

The electric light will burn and tan and develop freckles like the summer sun. How popular, says the Philadelphia News, it will be with families who spend the summer season in the back rooms of their houses?

A great offer by a reliable firm—Earrings, Finger Rings, French Diamonds, Amethyst, Garnet, Topaz or Coral, set in Rolled Gold, Solid Settings, only One Dollar. Read advertisement G. W. Pettibone & Co. in this issue.

On the 26th ult. the court in Philadelphia granted a five-day injunction prohibiting the American Rapid from erecting poles on Chestnut street in that city, but this will not prevent them from opening in that city within a few days.

Owing to the unexpectedly large demand for copies of the first numbers of the present year, our reserve supply of the Jan. 15 and Feb. 1 issues has become exhausted, so that we are unable to furnish copies of these numbers to new subscribers.

The manager of the Granby, Que., office has invented an electrical clock, which, he claims, runs as perfectly as any spring clock. After once being regulated, it needs no further setting or other attention, and can be run on two cups of gravity battery.

The Eureka Trick and Novelty Company advertises exceedingly pretty decorated pearl shells in the present number. This company is not unknown to OPERATOR readers and anything they have advertised has always proved to be what they represented it.

An advertisement will be found in this issue of Messrs. E. & F. N. Spon, publishers and importers of scientific books, 446 Broome street, New York. This old-established house publishes or

can furnish the different books on electricity, telegraphy and other scientific subjects.

The *Hamburgh News* states that the Northern Telegraph Company has concluded a contract with the Chinese Government for the construction of a telegraph wire between Shanghai and Pootsin, a distance of about 1,000 English miles. Nine or ten telegraph stations will be opened at the most important points.

The *London Daily News*, in its financial article in its issue of March 16, says: "Anglo-American cable shares are depressed; in consequence of the circulation of the prospectus of a new Atlantic cable company to lay a cheap cable in competition with the existing companies, as well as with Jay Gould's proposed cables."

A remarkable case of death by lightning occurred, March 18, at Florence, S. C. James Best was crossing a field on his farm during a thunder storm and was instantly killed by a stroke of lightning, which tore up the ground whereon the man had stood to so great an extent as to bury him completely from sight at the bottom of a hole several feet deep.

We desire to call attention to the advertisement of Messrs. Moore & Wilson, which appeared in our issue of Feb. 15, in which they agree to mail their charming story paper, *The Cricket on the Hearth*, free for four months to every one who will send them 12 cents to cover postage. This is a rare chance to obtain a host of first-class reading matter for almost nothing.

The contract for the erection of a telegraph line in China provides also that a telegraph school for educating Chinese for the telegraph service in all its branches shall be opened shortly. At the opening of the school there will be thirty pupils, which number will be increased gradually. This will afford a chance for some of the "professors" in our telegraph "colleges" to emigrate to China.

Mr. A. B. Smith advertises the Barron Flexible Key Knob in the present issue. These key knobs had a very extensive sale among telegraphers when advertised before, a short time ago, and the universal indorsements they received were of the most unmistakable character. There is no reason why they should not have an equally large sale now. Everyone troubled with telegraphers' paralysis should give them a trial.

The Perfected Type-writer, an advertisement of which will be found in this issue, is already well known to most of our readers. The type-writer is used by all the telegraph and telephone companies, but would doubtless come into more general use in connection with telegraphy if its advantages were better known. Messrs. E. Remington & Sons will send illustrated descriptive circulars free by mail on application.

A dispatch from Vera Cruz says that on Monday, March 28, the cable steamers *Dacia* and *International* began laying from that point the first section of the Central and South American Cable southward to Tehautepec. When they have completed this work they will return to England and take on the cable to be laid on the Pacific Coast from Callao, Peru, to Tehautepec Isthmus, via Panama, Costa Rica, Nicaragua and Guatemala.

A dispatch from Paris, on the 23d ult., says: The Minister of Marine has received a dispatch from the Governor of Senegal, reporting an engagement between 1,500 natives and 150 French infantry, who had been detailed to establish a telegraph line to Fouta-Jallon. After sharp fighting the natives were repulsed, and fled with a loss of 100 killed and wounded. The French lost four officers and nine men killed and nine wounded.

A complete unit of the Royal Engineers' Telegraph Train, says the *Electrician* of the 6th ult., embarked in the steam transport *France*, which sailed the other day for Natal. Two cable wagons were sent out with them, each carrying six reels of telegraph wire under the body of the carriage. As each reel contains half a mile of cable, a single wagon could provide a telegraph three miles long. In addition to this, however, a reserve of wire was taken sufficient for fifty miles of line. In operations in the field it is stated that these troops can take up and lay down a wire as fast as an army advances or retires.

Mr. H. W. Spang, of Reading, Penn., who will be remembered as the efficient superinten-

dent of the P. R. & P. Telegraph lines, has invented a remarkably ingenious automatic railway signal. By his new system a danger signal is always displayed until a locomotive or train approaching the section of track to be protected reaches the circuit closer or breaker, when the electro-magnet will be charged and the danger signal thereby removed from the view of the engineer and a safety signal given to him, provided the rails of the section of track to be protected are not occupied by a locomotive, train or car, a switch is not set for a siding or branch track, a rail is not removed or broken, and cars on a siding do not project too near the main track. Should the rails of the section of the track ahead be occupied by a locomotive, train, car, or pair of wheels, or even by a heavy iron bar, a rail removed or broken, a switch set for a siding, or a car, or cars on siding project too near the main track, the danger signal will remain stationary, thereby indicating to the engineer that something is wrong, and that he shall proceed with caution. Should a safety signal be displayed before the locomotive reaches the circuit closer and breaker, it will indicate that the signal mechanism has stuck, or is not working properly, thereby notifying the engineer to proceed cautiously.

NEW YORK CITY ITEMS.

Echoes from 195.

Dr. Osborne has returned from a three months' absence in Southern California.

A Jersey operator is credited with "dig and live" for "digestive," in a message from a Hoboken M. D.

It is the unanimous opinion of the Division Chiefs that all Mr. Lou Weller wants to make him perfect is a few brilliant flashes of silence.

The wife of Mr. John J. Kiernan, President of the Wall Street European and Commercial Telegraphic Agency, died at her residence in Brooklyn, March 26.

Mr. W. F. Bonnell, from the Cincinnati W. U. office, is finding much-needed relief from medical treatment in this city. He fills in several hours per day in the main office.

Mr. Thomas H. O'Reilley, of the Associated Press wire, recently sent 2,437 words in one hour. This is at the rate of 80 messages per hour, allowing 30 words to a message.

All the press circuits have been connected with the Associated Press rooms, up stairs. The agents are thus saved much annoyance, and the operators enjoy what is termed a "soft snap."

The management has concluded to dispense with the services of Mr. Brandell, the "fly" sender. In a parting epistle to a friend, he signified his intention of a hasty departure to Mexico.

As an indication of the way business piles in, Miss Mamie Crough, an office messenger in the main office, one day last week distributed on the Western circuits alone 485 messages in 40 minutes.

W. U. business has increased wonderfully of late, and the A. U. are called upon to transfer all of their spare men to help out, while several have already been permanently transferred from the A. U. to 195.

The city line switch board is presided over by Mr. Fred. Cushing. There being a scarcity of first-class lady operators, Mrs. Breck, formerly assistant to the lady manager, has taken a position at a table where good service is required.

A Lockport, N. Y., paper says that Manager M. W. Griffin, of the Western Union office in that city, received the Associated Press reports on March 22, at the rate of 58 words per minute, the sender being Operator Minier in the New York office.

Mr. Lambdin has returned from an extended vacation, or, as he terms it, "from having a three months' conversation with one in whose soul's salvation I am interested." The photographs which he circulated among the ladies were very much admired.

We have worthy men filling the positions of chief at large, wire chief at large and traffic chief at large, and unless some unworthy operators pay more attention to business there will be many filling the less lucrative positions of "operators at large"—outside of the office.

The Board of Aldermen last week authorized the Edison Electric Illuminating Company "to lay tubes, wires, conductors and insulators, and to erect lamp posts in the streets, avenues, parks and public places in this city, for the purpose of conveying, using and supplying electricity or electrical currents for purposes of illumination."

George Cunningham, formerly a clerk in the operating department, but recently employed as operator in the broker's office of Fiske & Hatch, died in this city last week from small pox. A younger brother also died from the same disease a few days later. They were brothers of Harry Cunningham, operator at 195.

The New York Electrical Society meets in the Geographical Lecture Room of the Cooper Union, at 8 P. M., Thursday, April 7. The first lecture will be on "Electrical Measurements with the Wheatstone Bridge," and will be delivered by Mr. George B. Scott, Superintendent of the Gold and Stock Telegraph Company.

The following from a 195 correspondent will, we are sure, be indorsed by all the operators in the W. U. main office: "Whatever else may happen in the way of changes, it is to be hoped that Manager Downer will be left with us. He always strains a point or two in favor of an indigent telegrapher, and in the realms of humanity he is a king among kings."

New York is the objective point of many Western operators recently thrown out of employment, several arriving daily. While there has been a demand for first-class talent at 195, it is being supplied from the N. Y. A. U. and A. & P. offices, so that operators looking for positions would do well to try and provide for themselves away from New York, rather than enter an overcrowded field.

The W. U. athletic games will take place on Thursday, May 19, if the grounds can be had for that day. The arrangements for the games are progressing very favorably, over fifty entries having already been received, and, judging by the subscription list, the medals will be valuable. Several Canadian telegraphic athletes are expected to be on hand to take part, and the committee hopes that other cities will send representatives, as the various games are open to all telegraphers. The entries close on the first of May. Programme of the games and further particulars may be had by applying to the Secretary of Athletic Committee, 195 Broadway.

The abolition of the "operators' service slip" is a blessing for all the good men in the W. U. service who have suffered by having their work, done on light circuits, contrasted with that of poor and unreliable men who happened to be assigned to heavy ones. Gen. Eckert looked into the matter personally, and as soon as it was shown to him that the system was doing an injustice to many of his best operators, he ordered its abolishment. The operators interested unite in thanking the General for this action. Gen. Eckert is doing all he can for those who will be thrown out of employment by the closing of A. U. and A. & P. offices. He is making room in the W. U. for men from the other companies for whom there does not seem to be any place.

Other City Items.

The routing clerk at 145 won a five-mile race, March 16th, but lost a week in recovering from the strain. The stakes were only a dollar.

Owing to an increase of nearly 65 per cent. in the gas bills of the White Star steamship line (which is attributed to the bad quality of gas), General Agent R. J. Cortis has adopted the United States electric light system for use on Pier No. 52, North River. In addition to using this light on the pier, it is proposed to use it in the holds of the White Star steamers while loading and discharging, thus avoiding the risks and inconvenience of gas or kerosene. Mr. Cortis believes that the saving will be at least \$100 a month, or 33 per cent.

The Mutual District Messenger Co. (Limited), are fitting up executive officers at 29 Murray and 33 Park Place, and will remove from present temporary location early in April. This company last week applied to the Common Council for the right to lay its wires underground throughout the city. If this application is granted, immediate steps will be taken to place their wires underground. A new district office has been fitted up and opened at 930 Broadway. This

office is a new departure in its way, being provided with a ladies' parlor in the rear part of the office.

PERSONALS.

Mr. F. L. Ames has been elected a director of the Western Union.

Mr. T. A. Edison has just obtained his three hundred and first patent.

J. C. Hinchman, general superintendent of the Western Union in this city, has resigned.

Mr. William B. Gill, assistant superintendent of the Western Union at Philadelphia, has resigned.

Captain Mackintosh, for a quarter of a century foreman of construction in this city, has resigned.

Mr. Charles E. Valentine, a well-known old-time operator, was buried at Oakland, Cal., on Thursday, March 17.

Miss L. Smith, formerly of Austin, Tex., is now manager, and Charles A. Flinn night owl, of the W. U. office at Jacksonville, Tex.

Mr. J. N. Taylor, Chief Clerk in Assistant General Superintendent's office, Met. T. & T. Co., has resigned, to go into mercantile business.

Mr. Warren E. Tice (Ic.), formerly of the W. U., this city, left March 26 to take a position with the American Rapid in Philadelphia, where his parents reside.

Mr. Jay Gould is reported to have given \$25,000 to the fund for General Grant. Mr. W. H. Vanderbilt did likewise. Mr. John Lenhart has not yet subscribed.

Maj. E. O. Brown, at present one of the most successful and popular insurance men in Toledo, O., was formerly manager of the Western Union office at LaFayette, Ind.

Mr. Frank J. Boudreau has resigned his position with U. P. Railway at Rock Springs, Wyo., and accepted a position as operator for the Southern Pacific in Arizona.

Charles F. Wood, Assistant General Superintendent of the Western Union Telegraph Company for New England, has resigned on account of ill-health, and will go abroad.

The Springfield, Mass., Union says that up to 4 o'clock P. M. on Monday, March 14, Mr. Geo. G. Ware, of the W. U. Office in that city, received 9,000 words of press report, and up to 6 P. M. 11,700 words.

Mr. Elmer P. Crooker, of Searsport, Maine, has been appointed ticket agent and operator for the Eastern R.R., at Wenham, Mass. He is a boy making a fair start, and goes to Wenham highly recommended.

Any information of the whereabouts of C. S. Kirtland, who, in December, 1879, worked for the Western Union at Bowling Green, Ky., will be thankfully received. Address W. M. Carpenter, Jr., Grand Rapids, Mich.

Mr. John A. Anderson is W. U. manager at Marion, Ind.; Wm. Ash and Mr. McDonough are with the P., C. & St. L. Ry., and jolly Mr. Buzzard and Mr. Hamaker with the C., W. & M. Ry. Mr. A. J. Grief is agent and operator for the T., D. & B. Ry.

At the inquest on the body of Conductor Carney, who was killed recently by an accident on the Pan Handle road, the jury, on the 14th ult., returned a verdict fixing the blame on H. A. Foster, the operator. As the verdict said nothing about criminal carelessness, Foster was not arrested.

The Pittsburgh & Lake Erie R. R. is 69 miles long, extending from Pittsburgh to Youngstown, O., and does a first-class business. It has 18 telegraph offices and about 30 operators, all good men. The Superintendent, Mr. Jones, always has a kind word for the boys when he meets them.

If any operator knows the address of John D. Cameron, an operator who worked in Board of Trade, A. & P., Chicago, Milwaukee and St. Louis, a year or two ago, he will confer a favor by communicating with him and his brother, J. A. Cameron, Napanee, Ont., who is dangerously ill and anxious to hear from him.

The C., M. & St. Paul Ry. telegraph line has been kept unusually busy of late, by reason of the snow blockades, and the fact that with the exception of one mail a week

all communication with the towns along its route had to be carried on by telegraph. Mr. H. R. Williams is train master of the road and Mr. E. H. Graves train dispatcher.

Mr. S. A. Muncy, who died at Summerside, P. E. I., March 9th, was an old-time operator. He was a native of Halifax, N. S., but had been in Summerside nearly twenty years. Up to within two years ago, when he resigned to accept the position of agent and operator for the P. E. I. Railway Company, he had been an operator in the Anglo-American Telegraph office.

Mr. W. H. Rinehart, of the Western Union office at Leadville, was married Feb. 23, at Denver, to Miss Kittie Clark. The joyous occasion created a sensation in Denver, and after the ceremony congratulatory telegrams came flowing in from all quarters. The presents were numerous and costly. Mr. Rinehart is deservedly popular in our profession, and we wish him and his bride much happiness.

The Washington Star, in speaking about the White House says: "The telegraphic operator is Benjamin F. Montgomery. He is the youngest man in the office, with one exception, and the wittiest. He possesses the adornment of light brown hair and a new growth of auburn beard. He can send and receive as fast as anybody that pounds brass. He has a new set of nickel-plated telegraph instruments, and is as proud of them as of his baby."

Mr. Wm. Gramlich is manager at Carlstadt, N. J.; Mr. J. E. Church, chief operator at Hackensack; Miss Fannie Bogert, manager at Upper Hackensack; Mr. J. F. Bouton at Cherry Valley; Mr. Harrison at River Edge; Mr. Ike Onderdonk at Westwood; Mr. E. B. Shurter (formerly of Kingston, N. Y.) at Hillsdale; Mr. Lew Bogert at Pearl River; Mr. P. Wilber at Nanuet; Mr. Will Thorne at Haverstraw, and Mr. Garry Haring at Stony Point.

On Saturday, March 26, Mr. J. J. S. Wilson, who since 1856 has been superintendent of the Western Union Company at Chicago, telegraphed his resignation of that position to General Eckert, to take effect March 31. On the same day Mr. Wilson's son, Charles Wilson, who for some time has been the electrician in the Chicago office, received notice from New York that his services would no longer be required. These are the first important changes in Chicago following the consolidation.

Mr. W. R. Plum, who has for some time been engaged in writing a history of the U. S. Military Telegraph, has gone to Lamy, New Mexico, to recruit his health, which was badly shattered by reason of overwork. He expects to remain in New Mexico until May, when he hopes to return to Chicago and devote all his attention to the work of finishing the writing of the book. The volume will contain from 500 to 600 pages, and promises to be a very interesting and valuable contribution to telegraphic literature.

READING, Pa.—Mr. Ambrose S. Miller, extra operator, P. R. & P. T. Co., was married, January 6, to Miss Maggie Craig. Their bridal presents were profuse and handsome. On Sunday, January 23, Mr. E. R. Adams, Superintendent's office, same company, was presented with a charming daughter, and on Sunday, February 20, Mr. F. N. Boyer, manager Reading depot office, also with a daughter. Died, March 15, Eugene Hoyt Boyer, aged 2½ years, only son of Mr. J. Harry Boyer, operator at general dispatcher's office.

Mr. Julius Wooten, a well-known operator in the Western Union Telegraph office in this city, left yesterday morning for Tampico, Mexico, where he will take charge of an office to be opened there on his arrival. Mr. Wooten came to Chattanooga from Florida during the scourge of 1878, and since that time, by his dignified bearing, genteel and polished manners, won hosts of friends, and gained great popularity in society. The best wishes of his large circle of friends follow him to his new home.—*Chattanooga (Tenn.) Times.*

Old man Kav put in an appearance at Tenth and Chestnut streets, Philadelphia, one day last week. A correspondent of THE OPERATOR, who passed him on lower floor, says he had a look of utter "brokenupness," and was in a completely demoralized condition. During the day Harry Schotte received the following "old timer"

note from the old man: "Fren Hary—I've jist cum in frum Chicargo, when I've ben wurkin' the soap racitt. Cum down stars and bring A quarther An wee will hav A foine tig. Til Deth. "OLD MAN KAV."

LEADVILLE, COL.—The Western Union office at this place is in charge of Mr. J. A. Hagerlund, manager, with Mr. W. H. Rinehart as assistant manager. The latter, who was married in Denver on the 23d inst., is the pioneer operator of Leadville, having opened the office here when the first line was run into "the camp." Mr. E. B. Beecher, a well-known operator and electrician, is chief operator. Mr. E. T. Ball is day operator, and Messrs. C. A. Batson and W. D. W. Storm are night operators. Mr. Weisse has charge of the branch office at the depot.

The A. & P. and A. U. offices in Bridgeport, Conn., were closed March 18th, the wires and instruments being transferred to the office of the W. U. Co. This large increase of wires crowds the Western Union office very much, it having now 55 wires, with little room to accommodate such a number. It is now no secret that the American Rapid Co. will open an office in Bridgeport April 1, and will occupy the former office of the American Union. Many predict for the "Rapid" a large business, in view of the fact that the office is to be managed by Mr. J. S. Krum, assisted by the former American Union corps.

PORTLAND, ME.—The A. U. and A. & P. have both put up their shutters. Manager Neff, of the A. & P., has left town, and Warren Mitchner, day operator, has left for parts unknown. Manager Preble, of the A. U., is still here, fixing A. U. business. Night operator W. H. Bailey has gone firing on the M. C. R. R.; Charles Steve a day operator, to Boston. Repairman Johnson, of the A. & P., has started a telegraph school, though in view of the consolidation there would not seem to be a very brilliant prospect for a "school"-taught operator to find employment. Telegraph business here is remarkably good for this season of the year. Mr. M. E. Hayes, day operator W. U. office, has been confined to his house with pneumonia since January, and is now sinking rapidly. M. S.

BORN.

DODD.—March 25, to C. H. Dodd, Agent and Operator I. C. R. R., Mona, Ia., a daughter.

MARRIED.

RINEHART—CLARK.—At Denver, Col., Feb. 23, 1881, by Rev. Dr. Moore, W. H. Rinehart, of the Western Union Leadville Office, to Miss Kittie Clark, of Denver.

DIED.

MUNCY.—March 9th, 1881, at Summerside, P. E. I., Mr. S. A. Muncy, agent and operator, aged 42 years.

BOOKS. DESCRIPTIVE CATALOGUE OF SCIENTIFIC Books and Price of any Book on Electricity sent promptly on application.

PATERSON, E. Electric Signals. Giving a description of electric bells and their construction, the arrangement of batteries, wires, press buttons, indicators, bells, telegraph instruments, telephone lines, lightning conductors, etc. Fully illustrated. Price, 20 cents.

BEECHER, F. S. Electro-Telegraphy. A book for beginners. 8vo., cloth. 60 cents.

BELL, ALEX. G. Researches in Electric Telephony. Many illustrations. 8vo., paper. 60 cents.

SPRAGUE, JOHN T. Electricity; its Theory, Sources, and Applications. Illustrated. \$3.

HIGGS, DR. PAGET. The Practical Application of the Electric Light. Illustrations of lamps and dynamo machines. 8vo. \$3.50.

HIGGS, DR. PAGET. Electric Transmission of Power; its Present Position and Advantages. Illustrations. \$1.20.

GORDON, J. E. H. Electricity and Magnetism. In two vols., containing 618 pages, and illustrated by 52 plates and 255 engravings. 8vo., cloth. \$7.

E. & F. N. SPON,
446 BROOME ST., NEW YORK.

DECORATED PEARL SHELLS.

These beautiful Imported Pearl Shells are found on the coast of Japan, washed up from the waters of the Pacific Ocean. The inner surface of each shell is decorated with a handsome oil painting, painted by hand in the most artistic manner, and representing Oriental flowers, vines, shrubbery, etc. The ornamentation alone, if done in this country, would cost much more than we ask for the shells. They range in size from 1 1/2 to 3 inches in circumference. When held to the light their polished surfaces will reflect all the colors of the rainbow, besides, being highly ornamental, they will be found very useful as card receivers or as receptacles for the thousand and one little nick-nacks which accumulate upon the centre-table or mantel-piece. We have purchased an entire consignment of these rare Arabian shells, at less than one-half their real value, and now offer them at the following unheard of prices: one shell, 15 cents—two for 25 cents—one dozen different sizes and designs, \$1.25. Each shell is packed in a strong box and sent by mail, post-paid. Clean postage stamps of any denomination accepted the same as cash. Address all orders to

EUREKA TRICK AND NOVELTY CO.,

89 Ann Street, New York.

Box 4614.



A GREAT OFFER BY A RELIABLE FIRM!

Goods shipped on day order is received! The following is a list of the various articles... No. 37, No. 32, No. 29, No. 30, No. 33, No. 36.

GOODS SHIPPED ON DAY ORDER IS RECEIVED!

Fine Table Silverware almost Given Away!

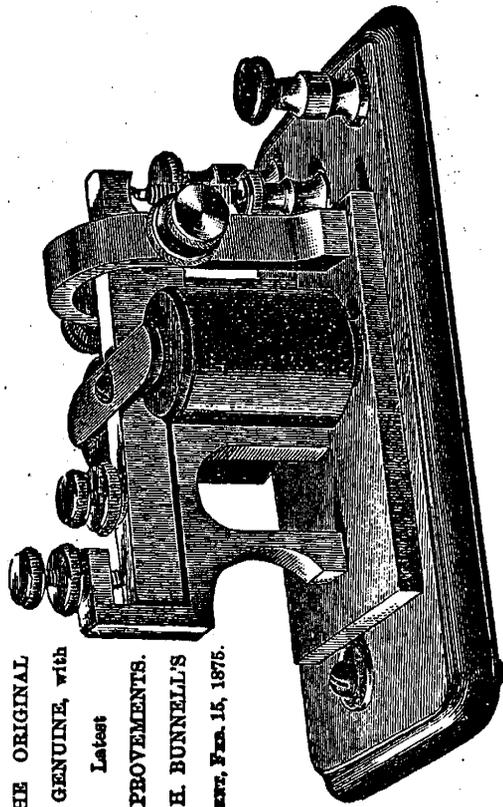


After years of experimenting, and by a large outlay of capital, we have at last succeeded in the production of Silver-Plated Ware of the most sterling quality, and of the rarest and most elegant design, at a reduction of fifty-two-thirds the former cost. Silver-Plated Ware has always been considered a luxury which many could not afford, but at the prices at which we are now offering it, it is much cheaper than anything else, as it will last a lifetime. There is hardly anything a lady takes more pride in than her table, and what will add more to the beauty of it than a handsome service of silver? and there is now no excuse for any one to be without it. In order to introduce our ware to the public, we propose, for a short time, to sell at our lowest wholesale prices direct to the consumer, thereby saving our patrons the large profits made by the jobber and retailer. Formerly any one of these articles would cost you more than we ask for the entire set, and it is only by manufacturing in immense quantities, and by our new process, that we can afford to sell at the following prices: Upon receipt of only Six Dollars, we will send by express, to any address, the five pieces represented in the above illustrations, viz.: No. 1. SUGAR BOWL—Exquisite in design and workmanship. No. 2. CAKE BASKET—Elegant (new model). No. 3. DINNER CASKET (6 bottles), very handsome. No. 4. BUTTER DISH—Very recherche design, with patent tray. No. 5. TEA OR COFFEE POT—Fire-proof. This ware is all White Metal, pure Coin Silver Plated, new in design and chasing, and unexcelled. The Tea or Coffee Pot is pure White Metal, silver-finished, fit for full family size, and is made with patent copper bottom, rendering it perfectly fire-proof. The Butter Dish has the latest patent tray, it is easily kept clean, and will not corrode like the old-fashioned metal trays. The above cuts represent the ware as accurately as possible, but do not do it justice. Remember, we send the entire list of five pieces by express, securely boxed, packed, and guaranteed to reach their destination in perfect condition, upon receipt of only Six Dollars; or we will send them C. O. D., provided One Dollar accompanies the order, the same to be deducted from the bill. Or we will send your choice of any one of the five pieces, securely boxed and packed, by express, upon receipt of \$1.50, and you may have the privilege of sending the balance, \$4.50, for the remaining four pieces in the set, after you have received the first. This is a rare opportunity to secure a magnificent set of Silverware. We have established a Salesroom in New York City, at 75 Day Street, where our goods will be found on exhibition, and if you are in the city, we would like to have you call and see them for yourself, or if you have a friend or acquaintance in New York, please ask them to call on us and examine the ware for you. The articles are all full size, as will be seen by the dimensions given above. Do not be deceived by inferior plated ware, as each piece manufactured by us has the Standard Silver Company stamped plainly upon it. Any person buying this ware, and not being perfectly satisfied, can return it, and his or her money will be refunded. Remittances made by Post Office Order, Draft on New York (payable to Standard Silver Company), or Registered Letter, at our risk. In ordering, please give your Name, Post Office, County, State, and your nearest Express Office. In writing, mention this paper. Address,

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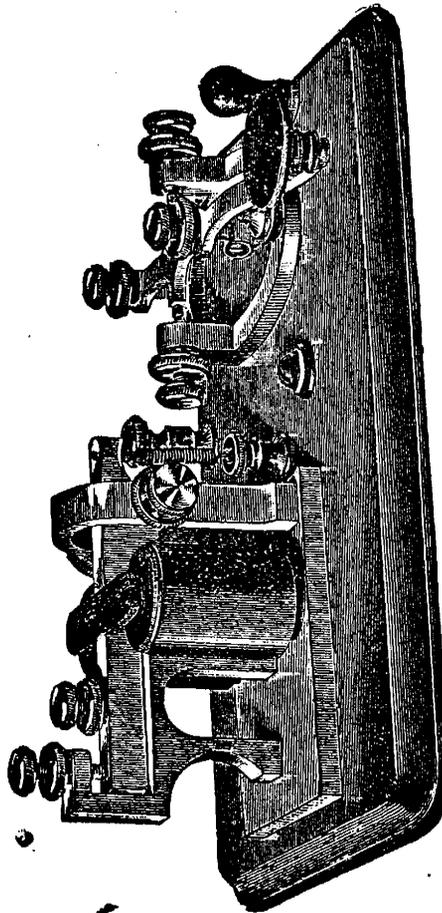
will give some idea of the style and scope of our new book, TELEGRAPHIC TALES AND TELEGRAPHIC HISTORY, which is now attracting so much attention. PRE-ELECTRIC TELEGRAPHS. Signaling among the ancients—Telephonic system of the African negroes—Signaling by sound in Montenegro—Fire communication in war and of war—The semaphore—The semaphore—Semaphoric blunder and its result—The word "telegraph"—Prediction quoted by Addison. THE ELECTRIC TELEGRAPH—ITS BEGINNING AND DEVELOPMENT. First lightning-rod man—Frictional electricity discovered—The Leyden jar—Experiments to Franklin's time—His famous kite experiment—Robert Stephenson's boyish imitation—Lomond's electric signals—Lessage's invention of electric telegraph using twenty-four wires—Reiser's thirty-six wire telegraph—Succeeding experiments to Morse and subsequently to present time. INTRODUCTION OF THE ELECTRIC TELEGRAPH IN THE U. S. 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Earliest military signaling—Introduction of field telegraphy—Field telegraph described—Dangers to apparatus—Firing guns by electricity—Telegraph in civil war—Its great value—What General Sherman said of it—Origin of U. S. Military Telegraph—Cost of service during war—Duties of telegraph operators—Acknowledgment of their services—Anecdotes of military operators' ready wit, heroic courage and nervousness—Funny war story—Another "Military operators' poor quarters—A provident telegrapher—Richmond taken—Receipt of the great news—Lincoln's assassination—Grand feat of Prussian soldier, and heroism of French female operator. CABLE TELEGRAPHS. General—The Atlantic cable—First suggestion of it—Its origin—Organization of company—Laying cable—The Great Eastern—Discouragements—First message—Suggestor wittily silenced by Mr. Field—Cost of first Atlantic cable—Recent improvements in cable laying—Mr. Field's services—Cable operators—Cable codes—A specimen—Its interpretation. HUMORS OF THE TELEGRAPH. 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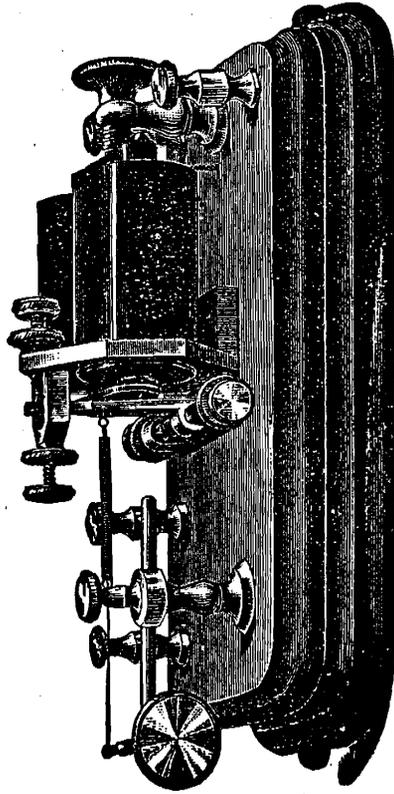
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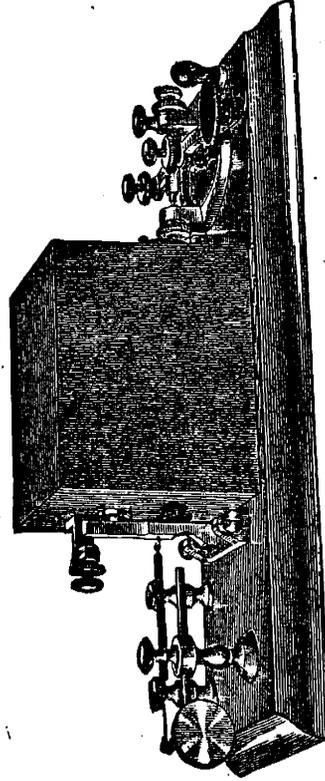
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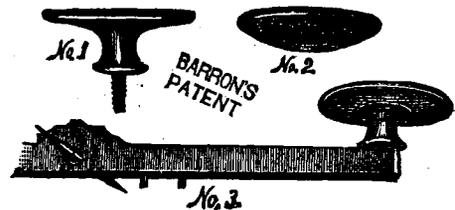
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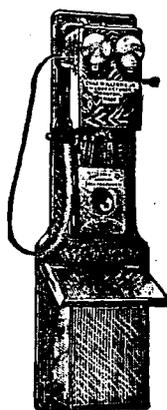
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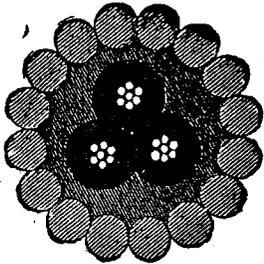
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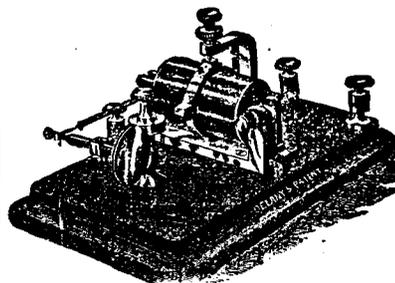
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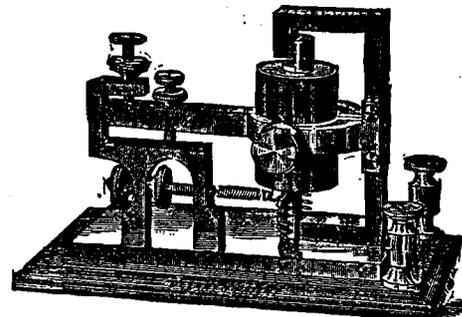
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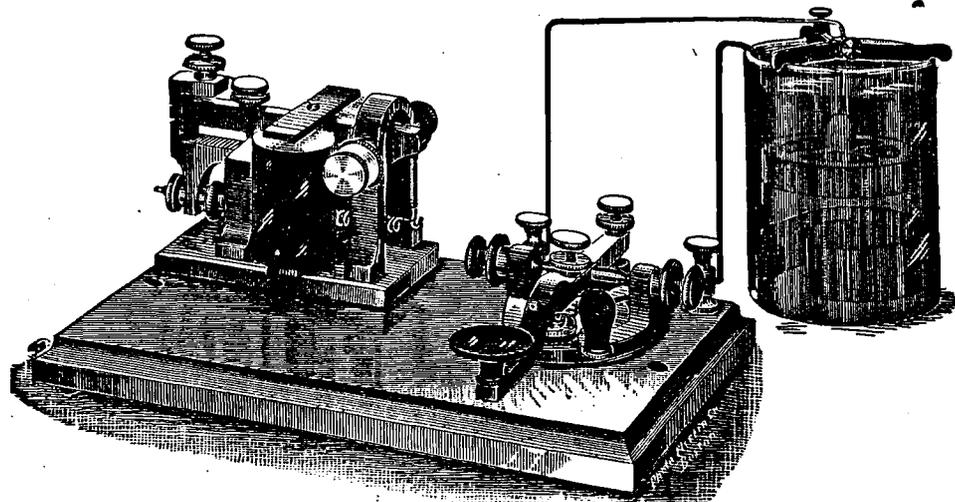
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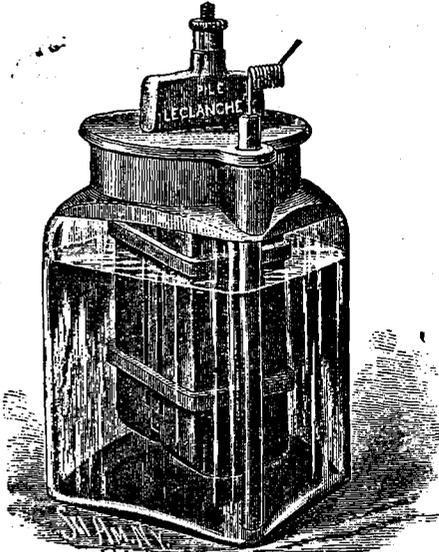
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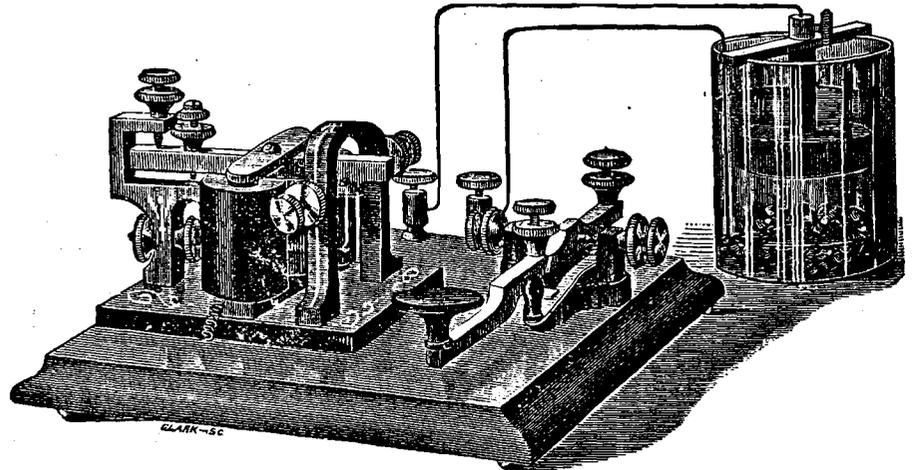
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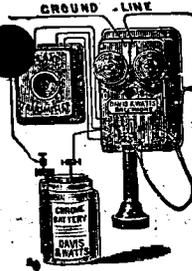
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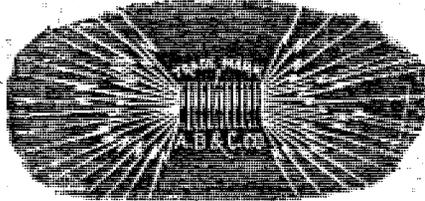
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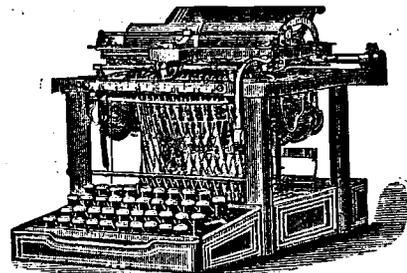
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