# The Operator

A JOURNAL OF TELEGRAPHIC, TELEPHONIC & ELECTRICAL SCIENCE, LITERATURE, NEWS & PROGRESS.

VOL. XIII.—No. 28. NEW YORK, DECEMBER 9, 1882. PUBLISHED WEEKLY. $2 A YEAR; 5 CENTS PER COPY


## HOW I BECAME A MISOGYNIST.

While the busy sounder heeding,
When the summer days were speeding—
Like my semi-monthly stipend—I one pleasant morning sat—
In there tripped a beauteous maiden,
With a silk umbrella laden,
Clothed in purple and fine linen and a massive cart-wheel hat.

Then this maiden sweet, aforesaid,
After entering the door, said:
"Sir, I wish to send a message to a person in the South."
Then she added, "I'll indite it,
You'll be kind enough to write it,"
And the words she sweetly uttered formed a halo round her mouth.

"In your happy new relation,
Pray accept congratulation,
And a thousand kindest kisses from your loving cousin Kate."
As she of the place made mention,
Looked I long with rapt attention
In the tariff book, for Blankville, in Louisiana State.

But I searched the volume vainly,
For an instant thought profanely,
Then a brilliant inspiration o'er my heated vision flew:
"To this town we're not connected,
But," I added, heaven directed,
"If to me you'll trust your kisses, I will try to put them through."

I had made the offer mildly,
But the sweet-faced maiden wildly—
As she grasped my meaning—glowered, though no single word she said;
And before I more could tell her
She had raised the silk umbrella,
And the weapon quick descended on my unprotected head.

* * * * * * * * *

When I consciousness recovered,
Darkness o'er the city hovered;
Feebly then I closed the office, filled with poignant grief and pain;
And I vowed when home returning,
All my soul within me burning,
That to take a maiden's kisses I would ne'er propose again.

CECIL.

## OUR NATIONAL PORTRAIT GALLERY.

### JAMES DOUGLAS REID.

We take pleasure in presenting to our readers to-day the portrait of the gentleman who bears the unique distinction of having been the first superintendent of telegraph in America. No other portrait would probably be acceptable to a larger circle of readers, for no one is more widely known to the electrical fraternity of America, or has done more to merit their esteem.

Mr. Reid was born in Edinburgh, Scotland, on March 22, 1819, and came to America with his parents in 1834. His entrance into business life occurred in Toronto, where he held, for a time, a position in the Commercial Bank of Canada. From here he removed, in 1838, to Rochester, N. Y., where it was his fortune to become associated with some of the men who were afterward to distinguish themselves in the development of Morse's invention. He was first an assistant in the Rochester post office, of which Mr. Henry O'Reilly was postmaster, who was one of the first telegraph line builders in this country, and whose name was familarly given to some of the earliest lines. From the post office Mr. Reid went to the office of the Rochester *Democrat*, where he made the acquaintance of Anson Stager, Mr. Reid being at the time book-keeper and young Stager the "devil" of the office. In 1845 Mr. O'Reilly, having taken a contract for the construction of a line from the seaboard to the West, recognized the merit and ability of his former post office assistant by engaging Mr. Reid to join him in the enterprise. Mr. Reid has amusingly set forth in his book, "The Telegraph in America," the thousand difficulties that had to be contended with in this pioneer enterprise, where they had almost no experience to guide them, and had to experiment and think out everything for themselves.

JAMES D. REID.

While in Philadelphia, preparing for the construction of this line, afterward known as the Atlantic & Ohio, Mr. Reid assisted Mr. Alfred Vail, of the Magnetic Telegraph Company, the first telegraph company organized in America, and whose lines were to extend from Washington to New York, via Philadelphia. Messrs.

ail and Reid opened the Philadelphia office in ovember, 1845, this being the first public tele-raph office in America, unless those on Prof. orse's original experimental line between ington and Baltimore may be so reck-. The Magnetic Company's lines were com-leted in June, 1846, and in October of the same ear the appointment of a general superintendent aving been found necessary, Mr. Reid was chosen or the place, which he had practically filled for ome time previous. In the following year, the O'Reilly lines having been completed, Mr. Reid vas chosen to a similar position there, and being alled upon to decide between the two, he chose he latter.

It would lead us too far to follow Mr. Reid's ubsequent career in detail; for that we must efer the reader to his book, where it will be ound incidentally and modestly set forth in his wn pleasant style. He was subsequently chosen for the superintendence of the Pittsburgh, Cincinnati & Louisville lines, the Lake Erie, the People's Line to New Orleans, and the New York, Albany & Buffalo, being sometimes superintendent of several companies at once. After the consolidation of the latter company with the Western Union (the terms of which were personally negotiated by Mr. Reid and Mr. Sibley), Mr. Reid joined the Western Union Company. He is still connected with the company, being at present engaged in the Bureau of Statistics.

No notice, however brief, of Mr. Reid's life would be complete without a reference to his literary labors. He established, in 1853, one of the first telegraphic periodicals, a quarterly called the *National Telegraph Review*, which was, however, in advance of its time, and only completed olume. In 1867, when President William established the *Journal of the Telegraph*, for the benefit of the service of the Western Union Company, he gave its editorial charge to Mr. Reid, who for five years conducted it with ability. During that period the *Journal* had a more distinctively literary character than at present, having since been reduced from a semi-monthly to a monthly issue, and almost restricted to the promulgation of the company's official notices. During Mr. Reid's management the *Journal* exerted a valuable influence and was the means of infusing an *esprit de corps* and sense of companionship throughout the entire service. We have referred above to Mr. Reid's *magnum opus*, "The Telegraph in America," which will remain a lasting monument of his literary industry and skill.

The success of that excellent institution, the Telegraphers' Mutual Benefit Association, has been largely due to Mr. Reid. The association was first proposed in a conversation with him, by Mr. D. R. Downer, now chief operator of the Western Union office in the Produce Exchange, this city. The scheme accorded so entirely with Mr. Reid's kindly and benevolent nature that he at once entered into it with zeal and pushed it forward to success. He was the first treasurer of the association and also its first president, and continued to hold office until three years ago, when he withdrew for the purpose of letting some of the younger men take charge.

Another affair, the success of which was almost entirely due to the energetic part taken in it by Mr. Reid, was the Morse testimonial, one of the most graceful public expressions of respect and honor that has ever been bestowed upon any man.

Mr. Reid's character is described by one who knows him intimately, as having in it something both gentle and lovable. He has always rejoiced in opportunities to do good, and the telegraphic fraternity has owed much in the past to his efforts to foster a kindly spirit among the high and the low in the profession. While enjoying the confidence and esteem of men such as Professor Morse and William Orton, Mr. Reid has always been distinctively the friend of the operators.

It is probably due to his tendency to think of others rather than himself, that he failed to reap pecuniary rewards such as were grasped by others who entered the field of telegraphy on an equal footing with him—men such as Ezra Cornell, Hiram Sibley and J. H. Wade—for certainly no one has contributed more to make the Morse telegraph a practical success than J. D. Reid.

## Electric Lighting.—VII.

### OHM'S LAW (CONTINUED).

We have all observed many times that different materials do not convey heat with the same facility. We can hold a short piece of wood in the fire by one end, even while the other end is being consumed, but we could not hold a piece of iron or copper very long before it would become uncomfortably hot and compel us to drop it. This is because a part of the heat becomes transferred to the end remote from the fire by the molecules of the metal itself. The metals generally are better conductors of heat than all other substances, but they vary in conducting power, for if we take a number of like rods made from different metals and subject them to the same heat at one end, the heat will reach the other end with varying rapidities, silver coming first, then gold, copper, zinc, iron, tin, lead, etc. We might express this relation in another manner by saying that the molecules of the metals named last offer more "resistance" to the passage of heat through them than those which come first in the list. This idea of resistance gives a more precise conception of the conditions. Heat, as we believe, is nothing more than a very rapid vibration of the molecules of matter, and it is plausible that all molecules of any kind offer a resistance to this vibration, for we know very well that it requires effort to set any object in motion, and as we also recognize the fact that the nature and character of the object greatly influence the time in which it can be set in motion, we can see how the molecular nature of a metal or other substance can affect its resistance to the conveyance of heat.

Now, everything that applies to the metals in regard to heat, will apply to them in regard to electricity as well. Electricity, also, is supposed to be a certain kind of vibratory action or disturbance among the molecules of matter, and therefore we can admit here that this action also meets with a certain resistance in the molecules of the substance acted upon by it, and that this resistance must differ in different substances, as in the case of heat. Those substances which give the least resistance are the best "conductors," while those which show the most are the poorest. Some substances have so much resistance that electricity of low electromotive force cannot pass through them at all, and for this reason they have been called "non-conductors." In practice such substances are used as "insulators," *i. e.*, they are placed between such parts of electrical apparatus as would be liable to come into accidental contact, to prevent the current from being thus diverted from its functions. Thus cotton or silk is wound around the wire of electromagnets, to insulate one turn from the contiguous ones, so that the current may be compelled to follow the whole course of the wire as intended.

The substance possessing the most resistance, and which therefore stands first as an insulator or non-conductor, is dry air; next come paraffin, wax, hard rubber, India rubber, gutta-percha, sulphur, glass, silk, paper (dry), hair, etc. Strangely enough, the metals are those substances which show the least resistance, as in the case of heat; and what is still more remarkable, is that the order is almost exactly the same for the ordinary metals: silver, copper, gold, zinc, iron, tin, etc. The difference between silver and copper is very slight, indeed, and when the copper is pure and well annealed, it is scarcely appreciable, so that silver is never used for electrical wire, copper being found to answer as well, and being very much cheaper. If we take a wire of the same length and size, of each of the metals which find a use in electricity, and take copper as the standard, calling its resistance 1, then the comparative resistance of the others will be indicated by the figures in the following table:

SPECIFIC RESISTANCES OF METALS, COPPER TAKEN AS STANDARD.

| | | | |
|---|---|---|---|
| Copper | 1. | Tin | 6.80 |
| Silver | .98 | Zinc | 3.70 |
| Gold | 1.13 | Brass | 3.88 |
| Iron | 5.63 | German Silver | 11.30 |
| Lead | 10.76 | Nickel | 7.70 |
| Mercury | 50.00 | Aluminium | 1.75 |
| Platinum | 6.78 | | |

Mercury cannot be made into wire, of course, but its resistance is compared by means of a glass tube of the proper bore and length, which makes the results the same as if it were in the form of wire. It appears that mercury shows the highest resistance of all these metals; the resistance of liquids, however, would be immensely higher than this, even. Thus, the resistance of water is over a million times that of silver; the addition of an acid or a salt has the effect of diminishing the resistance a little, however. The resistance of dry air is much higher still, being over a billion times greater than that of silver. The addition of water to the air in the form of vapor or moisture must evidently diminish its resistance then, since water has a lower resistance. Such is known to be the case.

The resistance of any substance increases directly with its length; consequently, if we make the length of any of these wires double, it will present twice the resistance. On the other hand, the effect of making the wire larger in size is to decrease its resistance; if we take a wire of twice the mass of metal (*i. e.*, weight per foot) then its resistance will be only one-half as much as that of the smaller wire.

An analogy will help us to understand this. The resistance which a pipe offers to the flow of water through it, under a given pressure, depends also on its length and size. A small tube will retard the flow much more than a tube of larger bore, or than a shorter one of the same diameter, even. Of two tubes, a large one and a small one, the large one will convey as many times more water as its orifice is times larger than the small one; so, if we want to use small tubes, we must use more of them side by side to make the total area of opening greater, if we require the same amount of flow; or else we must increase the "head," and cause the flow to be faster. In electricity this would mean an increase of electromotive force.

It must be evident now, since conductors of smaller resistance allow the current to pass more readily, that when a current is made to

divide at a point of its course into several "branch" circuits and then unites again (just as the water in a river divides itself to go around an island), then, if the resistance is equal in each branch, there will be an equal portion of the current passing through each; but if they are unequal, the branches which have the least resistance will take a greater share of the current. If, for instance, we had a division into two branches, one of which had a resistance four times higher than the other, then that branch would only receive one-fifth of the current while the other would receive four-fifths. A very important fact should be noticed in this connection; it might seem plausible, at first thought, to expect that if in a divided circuit we cut out any branch, say the one of highest resistance, that the total resistance of the circuit would be thereby reduced, but on the contrary it becomes increased. This will be plainly seen on referring to our analogy. No matter how small the smaller tube may be, still it makes the total orifice (we might aptly say the conductivity) greater by so much, and if we kept on adding such small tubes they would soon be equal to another large pipe. Again, take the case of a river dividing its course to go around islands. Each division, be it ever so small, helps to make so much more path for the passage of the water, and evidently the more of them we cut off the more the flow is impeded, because the same fall of level finds more resistance in making the water pass through a smaller passage.

The electrical resistance of a conductor, therefore, depends on three things: 1st. The kinds of metal, or "specific" resistance which is characteristic of each. 2d. The length of the conductor. The resistance increases in direct proportion to the length. 3d. The size of the conductor. The resistance diminishes in equal proportion with the increase of its weight per foot, or, what is equivalent to the same thing, the increase of area of its cross section. From these factors we can determine the comparative resistance of different lengths and sizes of wires of different metals. Thus if we wanted to use an iron wire instead of a copper one, it would have to be enough larger that the area of its section would exceed that of the copper wire of the same length $5\frac{65}{100}$ times, because the specific resistance of iron is that much higher than the specific resistance of copper; or else we could make it $5\frac{65}{100}$ times shorter, for the same size, though if we were using this wire in electro-magnets where a given number of turns around the core is needed to multiply the magnetic field due to the current used, then it would not be desirable to reduce the length. This shows quite plainly that copper is the best metal to use, because for a given resistance it would be both longer and smaller than any of the others in the table (except silver, of course), and therefore by its use a greater number of turns can be put into a smaller space. To these three conditions regulating resistance there is one more to be added; it is found that the resistance is affected by the temperature of the conducter, becoming greater as the heat is increased. In electric generators, where after running some time the coils become heated by the current, this increase of resistance becomes an important consideration. The unit of resistance which has been adopted by practical electricians is called the "ohm" after the discoverer of the law given below. The British Association preserves a coil of wire which is the standard ohm of resistance. All other standards have been made by comparison with it. In practice we use sets of coils varying from one-tenth to a thousand ohms. There are various ways of measuring the resistance of a wire, which the reader will find in the various text books on the subject of measurement. We can get some idea of the principle by mentioning the simplest one of them. If we place the wire to be measured in circuit with a galvanometer and a source of current, its resistance will evidently reduce the deflection more or less. Now let us take out this wire, and put in its place one or more of our test coils. If the deflection is less still, then these coils have more resistance than the wire to be measured. We try other coils of less resistance until the deflection is exactly the same as before, and then the total resistance of the coils in circuit is equal to the resistance of the wire to be measured. To give an idea of how much resistance is an ohm, we may say that a copper wire 250 feet long and $\frac{1}{20}$ of an inch in diameter has a resistauce of one ohm. Such a wire of that size of any metal given in the table would have a resistance as much larger as its specific resistance is larger than that of copper, and keeping in mind the fact that resistance varies with length and size, we can estimate the resistance of any other length or size from these data. The Congress of Electricians which met lately in Paris has decided on a new standard, namely, a column of mercury of an area of section of one square millimetre at 0° centigrade, and of a length sufficient to equal the British Association ohm. This length has not yet been determined with precision, but it will be probably about 1.0486 metre. Mercury was chosen because it can always be obtained in the required state of purity, and as its specific resistance is high, the length required for an ohm is much less. For the sake of abbreviation the word resistance is often indicated by the letter *R*.

It has been already shown, in our analogy, how the amount of flow depends on the pressure and the resistance of the pipes. The same conditions obtain in electricity. Dr. G. S. Ohm, a German physicist, was the first to investigate this relation, and his researches have left us a very important law, which has since become known by his name. This law is a statement that sums up all the facts we have just been studying by means of analogies, in a very convenient manner, thus: "The strength of the current varies directly as the electromotive force, and inversely as the total resistance of the circuit." This means that if the resistance is small, then it will require a less high E. M. F. to evolve a current of the same strength, and that on the contrary, if it is high, it will require a greater E. M. F. to produce a current of the same strength in this circuit. In other words, it is the resistance which consumes the energy of the pressure (E. M F.) impelling the current, and if the resistance is made greater, the energy of the E. M. F. urging the current is more materially diminished than before, in overcoming this resistance, and unless we add to the E. M. F. also, it will be insufficient to maintain the same "volume" (strength) of current in the circuit. Perhaps a briefer definition of these facts is that the current expends energy in going through resistance; or, again, that the work done by electricity in moving from one part of a circuit to another is equal to the resistance overcome.

The consequences of Ohm's law are expressed conveniently by saying that the current strength (often designated by the letter *C*) is equal to the electromotive force divided by the resistance thus:

$$C = \frac{E}{R}$$

The unit of strength, or volume of current, used to be known as the "weber," but it is now called the "ampère." An ampère is the amount of current which would be produced in a circuit if its resistance were one ohm, and its electromotive force one volt. For instance if the electromotive force of a given generator is 200 volts and its resistance (called "internal resistance"), added to the resistance of the external circuit, makes a total of 20 ohms, then the current which it is giving is equal to 10 ampères. Making *E* 400 and *R* 40 would also make *C* 10. The currents used in electric lighting are seldom of less volume than this; usually they are of greater strength, but in telegraphy the resistance of the line and of the relays and sounders is always so high, compared to the electromotive force, that the current is only a fraction of an ampère, usually about $\frac{15}{1000}$.

### REQUIREMENTS OF GENERATORS.

This knowledge which we have obtained of the laws underlying the production of electric currents will enable us to see whether they have been obeyed faithfully by later inventors, and to compare for ourselves the respective merits of these inventions. The law of conservation and Lenz's law told us that unless we use the right methods to transform it, the electrical equivalent obtained in return for the energy applied will be materially lessened by the amounts which will escape in other forms of force. Ohm's law shows what are the best conditions we should seek in order to obtain the best results in all cases. It teaches us, for instance, that a higher electromotive force will give a greater current, other things being equal. Hence, in our generator, we should strive to make the electromotive force as high as possible and convenient. The electromotive force in an induction circuit increases as the number of lines of force cut in a given time, and there are a number of ways to attain this result. 1st. By making the field of force as dense as possible, so as to have a greater number of lines of force in it; this may be done either by large permanent magnets or by electro-magnets, which are more powerful for the same size, and by making the poles enclose the armature coils as much as possible. 2d. By making the wires pass as near the poles as possible, for it is there that the lines are concentrated the most. 3d. By exposing a greater length of the wire to the cutting action of the lines of force. 4th. By making the motion as rapid as possible. Then we find that it is desirable, according to Ohm's law, to make the resistance as small as possible; therefore, 1st. The wire coils should not be too long. 2d. They should be as large as the space will permit. 3d. All the wire in the machine should be utilized—*i. e.*, it should not be disposed so that it fails to help the general action, for then it is simply a useless resistance. 4th. When a portion of the circuit—more especially of the armature—comes to a period where it ceases to be of benefit it should be cut out of the general circuit during that period, so as not to make useless resistance. In passing some points of the magnetic field, for instance, the wire of the armature does not cut any lines of force, and there its resistance would be only a dead weight to the electromotive force of the rest of the armature, just as the exterior circuit is. 5th. There should be little or no heating during action, so that the resistance may remain constant.

### SIEMENS' MACHINE.

The first important step toward the practical realization of these desiderata was made by Siemens about 1857. Siemens took a large number of horseshoe magnets and placed them side by

le in laminated style, so as to leave a long, ırrow field (*P*, Fig. 30), within which an arma- f peculiar form revolved. This armature 29) was made of a thick iron rod, just large ıough to fill the space between the poles of the ɛld, and it was grooved lengthwise at two oppo- te faces so as to make it look, when seen end- ise, somewhat like a letter H (as shown at *F*). ısulated wire was wound lengthwise in these rooves, as shown at *E*, until they were full, thus ıaking the armature round again. The com- ıutator had two segments, and one end of the ɔire was soldered to each, as in Pixii's machine. 'he iron portion of this amature served to con- entrate the lines of force still more, and as the ɔoles were already near, the result was that the vire was always cutting across a very dense ield. Siemens' armature possessed such obvious ıdvantages over all previous ones that it became ısed to the exclusion of all others, by subsequent


FIG. 29.

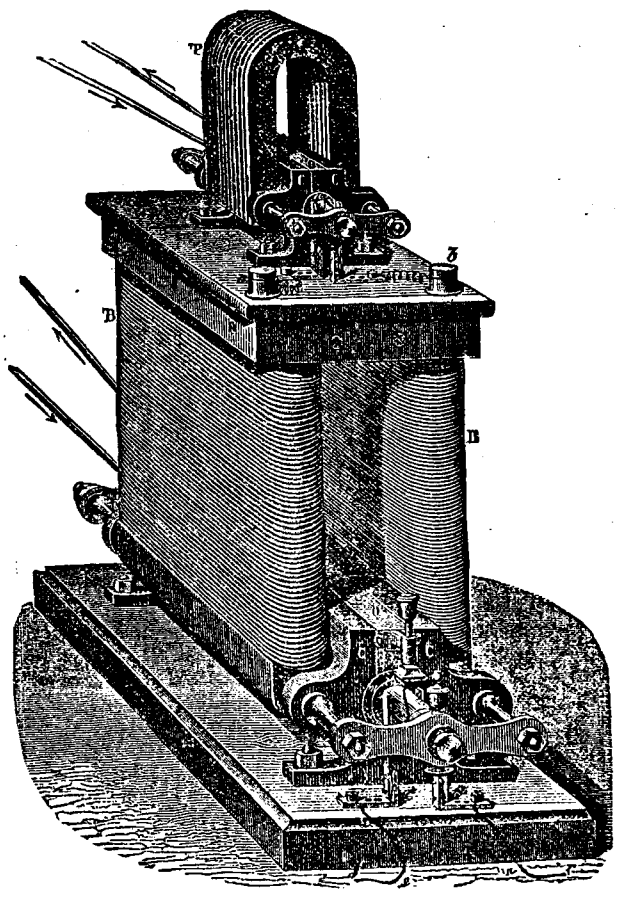



FIG. 30.

inventors, for many years. The present style of "magneto" used in telephony is really such a Siemens machine, the field being made by permanent magnets furnished with pole pieces of soft iron that are bored out so as to admit the armature, which is exactly identical with the original type used by Siemens.

WILDE.

itherto all machines had had their field of ɔrce produced by means of permanent magnets, and consequently were all of the class called "magneto-electric." About 1866, Wilde, in England, described an improvement which went a step farther (Fig. 30). The current produced by a small Siemens machine (shown at *P*), such as just described, was conveyed through the coils of wire (*B B*) which were wound around massive nets. These plates formed expansions at their lower extremities (*C C*) which approached each other, but were separated by wood (*O*). The plates were bound at the top to an iron plate; hence they formed a species of inverted U magnets, and each expansion formed a pole thereof. The round space between them was the magnetic field, within which a larger Siemens armature was revolved. Wilde's discovery was that while the lifting power of the permanent magnets (*P*) was not over 50 lbs., it was enough to induce the currents in the armature which, when passed through the large electro-magnet, gave it a lifting power of over 500 lbs.; consequently the currents produced in the larger armature were much more powerful. The machine, it is true, required much more power to drive it, but the gain in current was equal to it, and as the electro-magnetic field was both denser and more compact than a permanent magnetic field, a great advantage had been realized over the Alliance machine or its modifications. Hence general attention now became directed to that method of producing the magnetic field in generators.

C. O. M.

## Book Discounts.

With a view to encouraging the introduction of the books we publish, we have for some time made a discount of *twenty-five per cent.* from regular price, where $4 worth or over were ordered at one time. This discount, except to bona-fide agents, will be withdrawn next year. The offer, however, still holds good during the month of December. Those desiring any of these books at wholesale rates will do well to order them at once.

## The Telephone at Oberammergau.

The antiquated Bavarian village of Oberammergau, which has become known throughout the world as the scene of the annual representation of the unique "Passion Play," has lately been heard from in a new way—by telephone. One of the entertaining features of the Munich Electrical Exhibition was a telephone placed in communication with that village. A correspondent of the *Pall Mall Gazette*, writing from Oberammergau, describes the interest excited among the villagers by the instrument. He says:

"It is an absolute novelty; and while any gaping interjectional wonder is foreign to the character of the ever self-possessed and dignified Ammergauer, there is manifested the liveliest interest in the new wonder, and a wideawake appreciation of the vista of practical possibilities opened up by recent progress in electrical inventions. The apparatus has been fitted up in the private dwelling of Herr Stubenvoll, the village schoolmaster. The object primarily aimed at is not, of course, the amusement of Ammergauers, but that of visitors to the Munich Exhibition, who indeed show themselves eager enough to hold communication with the inhabitants of this uniquely famous village. Choruses from the music of the 'Passion Play,' jödelling songs in the local dialect, and instrumental solos of all kinds are in constant request; and the large, cheerful sitting-room at Herr Stubenvoll's is daily, from ten in the forenoon to eleven o'clock in the evening, a busy rendezvous for the chief musical talent of the village. Round the large paper funnel are arranged the harmonium, pianoforte, and a table covered with manuscript music, and the various instruments likely to be in request.

"The evening is the busiest time with our telephone. Not only are there then more visitors to the Glas-Palast, but here, also, there are more volunteers ready to communicate with them. Work is over in the wood-carving school. The cows have tinkled their way home from the mountain slopes, and have been milked and stalled for the night, and the time for chat and smoke and song has begun. Chairs are set for the accommodation of chance visitors, and at 7:30 the room begins to fill. One not very luminous oil lamp just sufficiently lights the scene, and round it, with beer and pipes, sit the picturesque soloists and singers. Conversation is carried on mostly in whispers, that the communications from Munich be well heard. Again and again the door noiselessly opens and one after another the volunteers drop in, each with a hearty 'Grüss Gott!' to the assembled company as he doffs his green, befeathered and betasselled Bavarian hat, and, with as little noise as is compatible with the heavy mountain boots on a bare floor, joins the group round the table in front of the telephone. Fraülein Schallhammer has had so much to do with the telephone now for several weeks past that she begins to find it somewhat tedious, and in the intervals when her singing is not required buries herself in a novel. Many times a day comes the request for a song from her sweet, fresh voice, and many a greeting and message of appreciation is sent back to her in reply from the audience seventy-five miles away.

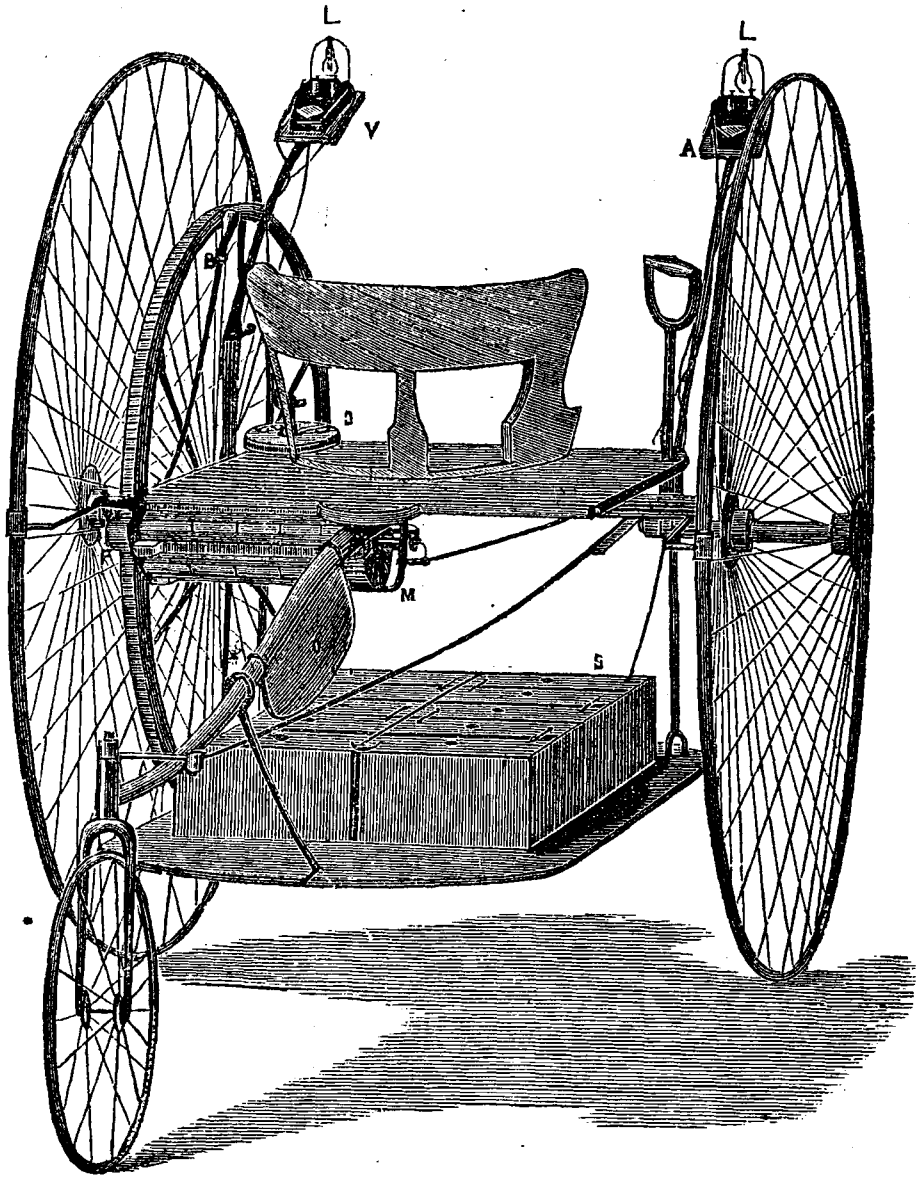
"But Munich listeners are not always contented with music, however excellent. Many are the requests for something more distinctively peculiar to Ammergau and the Oberland. Herr Christa must blow the post-horn as one hears it every evening when the mail 'omnibus' comes in from Murnau, or the jödel must be given with

the true Alpine ring about it; and we have even heard the request made (and responded to) for the unmusical 'halloo' with which huntsman or herdsman occasionally wakens the echoes among the surrounding crags. This cry has a wild hilarity of its own, pleasant enough to hear at a distance, high overhead among pine forests and precipices; but it is a little startling when uttered in a room eighteen feet square. Many are the inquiries after Josef Mayer (or, as his neighbors always call him, 'Christus Mair')—so many that a smile goes round the room every time Herr Lehrer makes the announcement. The latter charges himself with the general reply: 'Herr Mayer is quite well; he lately made a little expedition among the mountains, but is now at home again.' Occasionally a foreigner who understands no German presents himself at the Munich end of the wire. In such case Frau Stubenvoll, who is an adept in French, and has a fair knowledge of English and Italian, undertakes the conversation. The wire from Munich communicates not only with Ammergau, but also with the intermediate village of Tutzing. Hence, conversation can be here heard passing between Munich and Tutzing, and communication held between the three points at once. An amusing experiment has been successfully made on several occasions. Tutzing and Ammergau sing duets, which are heard in perfect harmony, and as if from one point, by the Munich audience. On one occasion Munich struck in with a third voice, and a trio was achieved in excellent style between the three localities."

### The Electrical Tricycle.

We have already noticed the application by Professors Ayrton and Perry, of London, of electricity derived from Faure accumulators to the propulsion of a tricycle. The accompanying illustration, which we reproduce from the London *Electrical Review*, represents the vehicle. *M* is their electro-motor, placed underneath the seat, and the spindle of which is geared with the driving wheel of the tricycle, 44 inches in diameter, by means of the pinion *P* and large toothed wheel. The pinion has 12 teeth on it, and the large toothed wheel 248, so that the motor turns about twenty times as fast as the tricycle wheel, or makes about 1,200 revolutions per minute when the tricycle is going at eight miles an hour. The secondary battery, *S*, composed of Faure cells, is carried on a small wooden platform, suspended from the backbone of the tricycle. By means of a commutator, *C*, seen at the left-hand side of the rider's seat, and worked with his left hand, the number of accumulators in circuit with the electro-motor can be varied at will, and the speed of the tricycle altered accordingly. *B* is the handle of the ordinary brake, which can be applied with the left hand immediately after turning off the current with the commutator *C*. Since, by means of this commutator, the full power of the accumulators can only be turned on by passing through the intermediate powers, shocks to the tricycle and rider are not experienced at starting. *A* is one of Professors Ayrton and Perry's ammeters which measures at every moment the main current, and *V* is one of their voltmeters, the readings on which continuously show the electromotive force between the terminals of the motor, so that from the readings on the two instruments the rider can calculate at any moment the horse-power that is being expended in propelling the tricycle. *L L* are two small incandescent lamps of about four candle-power each, and which are illuminated by a small current produced by two of the accumulators used also for the driving. The lamps are placed in the position shown, partly for the purpose of illuminating the track and partly to light the ammeter and voltmeter.

The motor employed is one of their ordinary half horse-power patent motors, weighing 45 lbs., the smallest one that was completed when the tricycle was fitted up, but it is obvious that it is unnecessarily powerful for driving a tricycle. The smallest weight of accumulators that they have yet employed to produce a speed of six miles an hour on the level is 150 lbs., and which contains a store of electric energy equal to about two horse-power-hours. With this load the tricycle will not only propel itself, but, when going slowly, will exert an additional pull of about 33 lbs., as measured by a spring balance attached to its back, and held by a person attempting to resist the motion of the tricycle. With a somewhat larger weight of accumulators they have maintained a speed of eight miles an hour for a considerable time with a man of average weight riding. The tricycle is an ordinary one converted to this new use by taking off the treadles and chain gearing and replacing it with the electric arrangements seen in the figure; but we understand that the designers, encouraged by the success of the converted vehicle, are at present engaged on a tricycle specially suited for being electrically propelled, and in which, among other improvements over the present machine, will be so arranged that not merely the riders but also the accumulators will be hung on springs. In their present form of electric tricycle the ordinary treadles to be worked by the feet are entirely absent, but in their first form the treadles were left on so that the feet and the electric propulsion could, when going up steep hills, be used to help one another, an advantage which may lead them, we are told, to introduce foot treadles as a supplement to the main electric driving power in their third and newest form of electric tricycle.




THE ELECTRICAL TRICYCLE.

An operator on the Montreal & Dominion lines submits the following, and wants to know if it is a "bull": The original address was to "Kirkwood, St. Louis County, Mo.," which was transformed into "Kirkwood street, Lewis County, Montreal." The same receiver once made "Port Henry Coon Company," out of "Port Henry Iron Company.'

*PUBLISHED WEEKLY AT*

**No. 9 Murray Street, New York.**

Entered at N. Y. Post-office as second-class mail matter.

W. J. JOHNSTON, Editor and Publisher.

NEW YORK, DECEMBER 9, 1882.

## NOTICE.

We are sending a sample copy of the present issue free to a large number of offices where we have not at present subscribers. Our object in sending it is to let non-subscribers *see what* THE OPERATOR *is like*, and, if possible, to secure their aid and co-operation in our efforts to still *further improve the paper*, and add to its influence and usefulness.

THE OPERATOR, which with the issue for January 6, 1883, enters upon its FOURTEENTH volume, is now published WEEKLY, and is the only electrical journal on the American continent that is issued so frequently. It is, therefore, the only one that can keep its readers *thoroughly* and *promptly* informed of everything of interest to them transpiring at home and abroad.

We will mail a copy of THE OPERATOR from the present time until January 5, 1884, postage prepaid and address changed as often as desired, for $2.00.

To CLUBS of FIVE or more we will send a copy of the paper every week for a year, postage prepaid, for $1.50 each and an EXTRA COPY FREE to the person sending a club of TEN yearly subscriptions at this low rate. We would ask *non-subscribers* who may see a copy of this issue to start a club, by putting their names down and asking their friends in their own office or over the wire to join them in *sending for the weekly* OPERATOR at $1.50 a year. By securing ten yearly subscriptions you will get your own copy free. If others are slow about joining you, send on $2.00 for your own subscription, and deduct the difference when you send the other names. You can easily get some to join you if you only try.

*Present subscribers* will confer a great favor upon the Publisher, and at the same time benefit themselves and the fraternity, by drawing the attention of telegraph, telephone and electric light men to the above *remarkably low club rates*, with the request to *join their club for the ensuing year, at $1.50 each.* Many subscriptions expire with the last number for the present month. new, will not be able to sent at least four additional subscriptions besides their own, and that many will send ten, and thus secure their own copy for next year free.

Subscribers for 1882 receive thirty-one issues (some even more) instead of twenty-four; yet they have not been charged anything extra for the additional copies. We hope they will reciprocate, and show their appreciation of the improvements recently introduced, by not only promptly renewing their own subscriptions, but also by *getting us as many additional subscriptions for next year* as they can. Now is the time to commence the effort in that direction, so as to get as many names as possible before the first of January. Extra copies for use as samples will be mailed free on application. Send for some and do what you can to forward the good work.

## THE CABLE CONTROVERSY.

The controversy between the presidents of the Baltimore & Ohio and Western Union companies, relative to the alleged inspection, by persons connected with the latter company, of messages offered for transmission by cable, having degenerated into an ignominious question of veracity between minor employés of the two companies, it would seem that the proper thing, under the circumstances, would be to tender apologies all round and let the matter drop. The person deserving of public sympathy is the president of the Corn and Flour Exchange, of Baltimore, who, without being consulted in the matter, and probably with no special interest in it, is made the victim upon whom all this mass of recriminative correspondence is precipitated.

Mr. Garrett, endeavoring to substantiate his original allegation, asserts that he received his information from his superintendent of telegraph, Mr. Stewart; Mr. Stewart says he got it from Mr. Price; Mr. Price declares that he had it from Mr. Fleming, a clerk in the cable office, and Mr. Fleming swears he never said anything of the kind. This story bears a striking resemblance to the ancient one about a traveler who set out upon a broad highway, which presently narrowed to a common country road, this in turn to a foot-path, while the latter finally dwindled to a squirrel track and ran up a tree.

The extracts from Mr. Pender's letters, which Mr. Garrett ingeniously submits to prove that Mr. Pender had admitted a Western Union espionage upon cable messages, while they imply that such a thing might be possible, cannot be fairly construed as indicating a belief on the part of Mr. Pender that such an espionage is or has been exercised. These extracts, indeed, mostly refer to a different matter—to the effort that Mr. Pender was making to have the cables thrown open to the opposition land companies, for the transmission of their cable messages from and to inland points, his object being to thus render the laying of opposition cables unnecessary. Such a policy would, no doubt, be a wise one for the cable companies, and possibly for the Western Union Company also, though it would be a bitter pill for the latter to swallow; but it is too late now, if Mr. Bennett's assertion may be accepted, that nothing can now hinder the laying of the new opposition cable.

THE New York *Herald*, in its anxiety lest the with the Western Union Company before Mr. Bennett gets his new cable laid, and being unable to think of any other argument to employ for the purpose of causing them to go slowly, issues a new appeal, on the ground that it has discovered that the Western Union Company does not own all of its lines, but that some of them belong to railroad companies which may refuse to renew their leases to the Western Union Company when they expire, and thus the press associations might, by reason of their contracts with the Western Union Company, be cut off from the collection of the news in various parts of the country. This sage utterance of the *Herald* contains a larger proportion of humbug than any other that has lately come to our notice. Even admitting—what is not likely to occur—that the Western Union Company were to lose its leases of certain railroad wires, it would still, probably for years, possess enormous advantages for the collection of news over any other telegraph company. But there is not much likelihood, in any event, of the Associated Press severing its connection with the Western Union. Each of these bodies aims to have a complete monopoly in its own field, and the mutual support that they have always been able to render each other toward this end constitutes a tie not to be broken—at least, by any such comical scarecrow as this latest one of the *Herald*.

ON December 1 a new penal code went into effect in New York, the most notable feature of which is its stringency in regard to the observance of the Sabbath. Some apprehension was felt that an effort might be made by the police authorities of this city, under the code, to close the telegraph offices on last Sunday. No such effort, however, was made. Possibly if there had been it would not have been a source of much grief to the operators. It is questionable whether the amount of telegraphic Sunday work required might not be much reduced. It is probable that on railroad lines, at least, it might. There are some railroads that make of Sunday a regular clearing-up day, and run more freight trains on that day than on others, because, a number of the passenger trains being out of the way, they are better able to run "wild" trains. One of the reasons why telegraph operators should always hold in grateful remembrance Mr. J. D. Reid, whose portrait embellishes our present issue, is that during his long telegraphic career he always employed his influence and efforts toward reducing to a minimum the amount of Sunday work required of operators.

THE organization of an association of railway telegraph superintendents is a commendable proceeding. A comparison of views and experiences regarding the handling of train orders, automatic and other signals, block systems, etc., cannot fail to result in much good to the telegraph superintendents, the railroads and the public. There are some important topics, however, that we miss in the list of those announced for discussion at future meetings, such as the standard to be employed in the examination of operators for railroads; how to improve the railroad telegraph service, and the danger and false economy of hiring so-called operators from telegraph colleges because they will work cheaply. For, after all, the essential, fundamental unit in every railroad telegraphic system is the operator, and it is useless to discuss mechanical devices and ingenious rules and methods, while ignoring him. We wish the new organization success, and hope

in the important field of railway telegraphy, as well as a source of social pleasure to its members.

NOTWITHSTANDING the dictum of certain learned scientific journals that such a thing is an impossibility, the daily papers again report the administration of mild electrical shocks to a number of horses on Fulton street, in this city, caused by an escaping current from the mains of the Edison Electric Illuminating Company. In this instance it is explained that the conduits that contain the wire on both sides of the street are connected by a bridge, and the bridge plate, a circular iron disc about a foot in diameter, is level with the roadway. The melted snow penetrated the interstices of the plate and formed a connection between it and the wires. This story is plausible enough, especially if the bridge plate be partly insulated from the adjacent earth. The Edison Company may be relied upon to look after little defects of this kind, for the injury they are liable to do to the company's plant is much greater than any that could be sustained by the horses, from a current so weak as that of the Edison system.

THE action of the Western Union Company in furnishing the free use of its lines for the transmission of accurate astronomical time for the benefit of the observers of the transit of Venus, on last Wednesday, shows an appreciation of the value of abstract scientific research that would be still more commendable if it went a little further, as, for instance, to the investigation of the phenomena of earth currents, in which the company has a more direct interest than in transit observations, and which cannot be carried on without an extensive plant, such as that company possesses.

ONE of the most remarkable anomalies that the world has ever seen would be an opposition telegraph company that would reach maturity without becoming involved in litigation. The little Board of Trade Telegraph Company that set out so auspiciously from Chicago a few months ago, to go to St. Louis, is already beginning to appreciate that the way of the opposition telegraph company is hard.

THE re-assembling of Congress, with its accompanying stimulation of the telegraphic business of the country, is a welcome event to all except the press operator who works regularly until the close of "report" every night. To him it means simply a large increase of work without any corresponding increase in emoluments. His holiday is over.

MR. GOULD is evidently discouraged. The adverse decisions in the Williams and Hatch suits, the perfidy of his wicked Mutual Union partners, and the overthrow of his cable monopoly by Mr. James Gordon Bennett, are too much for him. He has just bought himself an acre of ground in Woodlawn Cemetery, for a burial plot.

THERE are people who are never satisfied. Some of the daily papers are now objecting to the electric light because it is too brilliant. They assert that it dazzles the eyes of pedestrians and makes it difficult for them to select their footing. This is an objection that would apply with much greater force to the sun.

THE plea of the Postmaster General for a governmental system of telegraphy would merit more attention if there were any probability of Congress taking up the matter, or if there were a general feeling that such a system is desired by the people. As it is, the Postmaster General's argument falls rather flat.

THE electrical tricycle which we illustrate in the present issue, while not, perhaps, of any great intrinsic value, is of much interest as representing the first feeble steps of electricity in a hitherto untried field—that of the propulsion of vehicles upon ordinary roads.

As the present issue contains several of our own announcements, in addition to the regular advertisements, we have increased the number of pages in this number from 24 to 32, so that the usual space devoted to reading matter shall not be encroached upon.

## More Underground Experiments.

Some three months ago we gave a description of an underground conduit for electrical wires invented by Mr. R. S. Waring, of Pittsburgh, which promised good results. Mr. Waring has been industriously working to perfect his system since that time, and recent tests have been very satisfactory. That mammoth corporation, the Standard Oil Company, has a private line extending from the general offices on Seventh street, Pittsburgh, to the various refineries of the company, scattered along the Allegheny Valley Railroad for a distance of nine miles. For this distance a cable has been laid, branching off into each refinery. The cable contains five wires, on which both Morse instruments and telephones are used. The plant was completed on Nov. 27, and a test showed that the usual annoying extraneous sounds in the telephone were entirely absent, although both Morse and printing instruments were in use on other wires in the cable.

The electrician who had charge of the test, Mr. Henry Van Hoevenbergh, formerly of the Atlantic & Pacific Telegraph Company, and afterward of the American Union Company, said in speaking of the new process:

"The lead cable consists of a fluted, six-chambered lead pipe, containing, five No. 14 copper wires, the diameter of each of which is about 64-1,000 of an inch, with a resistance of about 12 ohms a mile; the resistance of the insulation of these conductors is about four megohms or four millions of ohms per mile. The average resistance of insulation of air lines is from two to three megohms, according to the weather. The lead cable is not affected in the least degree by weather or temperature. The cable requires no box in the trench whatever, and only such protection by earth as will keep it out of the reach of injury from the surface. The cable weighs one and a half pounds per foot, and is made in half-mile lengths, which are wound on reels for laying; these reels are drawn by horses and the cable is as readily placed in position in the trenches as is a rubber hose from the carriage of a city fire department. The principal cost in the use of the cable is in the trench, which would make one wire almost as expensive as twenty; but a cable containing twenty wires can be laid as cheaply, so far as mere actual outlay of money is concerned, as an air-line of the same number of wires strung on poles. In all systems of underground electric cables hitherto devised there has been an inflexible superstructure, the wires have always been placed in iron tubes, brass tubes, coverings of glass, wooden boxes or similar immovable and readily disarranged substances. This cable overcomes difficulties which arise when inflexible materials are used; the freezing and thawing of the ground, throws the inflexible superstructures out of position, breaks or renders unfit for use the wires, and causes serious trouble. The lead cable adjusts itself to all such natural effects and is not thrown out of line by any of them. The lead is packed around the wires in a machine which gives it a hydraulic pressure of 6,000 pounds to the inch, making it without flaws, air holes or other imperfections; the lead covering, therefore, must be uniform in its strength, thickness and density."

During the recent electrical storm Mr. Van Hoevenbergh tested the cable, and was unable to discover any disturbance.

Tests for induction, made with a Thomson galvanometer, it is said, do not show any interference from one wire to another.

Our information does not state what insulating covering is used for the separate wires; we infer that it is the ordinary paraffined cotton braid. It is claimed that in this system there is no trouble from retardation.

## Right of Way for Telegraphs.—An Important Decision.

The Mutual Union Telegraph Company set up poles on the roadside in front of C. C. Dusenbury's house and lands in White Plains village, and paid him nothing for the privilege. He sued the Company to get the poles removed. The company answered that a special statute gives it the right to put up the poles, and that the fee owner of the property must set in motion the judicial machinery provided to measure the compensation due him.

In a decision handed down on Dec. 2, Justice Dykman says the statute involved does not attempt to confer on the company any such authority as the company asserts. After defining the difference between governmental and private corporations, he says:

"The gulf between governmental corporations and commercial companies is nowhere wider than at the question of eminent domain, and the gulf is not bridged by clothing the latter with a public character, by the court, to enable them to make the exercise of the right of eminent domain. The text writers agree that these private companies ought to be required to pay before they appropriate. The plaintiff must, therefore, have judgment."

## Agents.

We are anxious to secure, if possible, an agent for THE OPERATOR and for the books we publish in every city and town in the United States and Canada, wherever there is a telegraph office, a telephone exchange or an electric light station. The cash commissions we allow agents are so liberal that an energetic person can add considerably to his salary in this way, without much trouble and without in any way interfering with his regular duties. Those in a position to act as agents will oblige by dropping us a note or postal to that effect. Sample copies of THE OPERATOR and of circulars, etc., will be mailed free on application,

## The Cable Controversy.

The controversy between Mr. John W. Garrett, of the Baltimore & Ohio Railroad and Telegraph Companies; Dr. Norvin Green, of the Western Union Telegraph Company; Mr. John Pender, of the Direct Cable Company, and various minor officials of the companies named, arising from a statement made by Mr. Garrett at a banquet of the Baltimore Corn and Flour Exchange, to the effect that he had been informed by the New York manager of the cable company that messages offered for transmission by the cables must be subject to inspection by persons connected with the Western Union Company, has become so involved during the past week, and the documents submitted on all sides have become so voluminous, that we can do no more than present a summary of the week's developments.

On Nov. 30 Mr. Garrett furnished to the press a letter addressed to the president of the Corn and Flour Exchange, in reply to one submitted by President Green, in which the latter had denied the truth of President Garrett's original statement. In this letter Mr. Garrett gives in detail the grounds upon which his charge was based. He asserts that in August last he had occasion to transmit to the vice president of the Baltimore & Ohio Company, then in France, certain important cablegrams. He accordingly directed his assistant to ascertain in New York whether cable messages could not be forwarded to France by the Direct United States Cable Company without going through the hands of the Western Union Telegraph Company. In reply to his inquiries Mr. Garrett's assistant received from Mr. Robert Stewart, superintendent of telegraph of the Baltimore & Ohio Company, a letter stating that he had learned that cable messages were sent direct from the Broad street office of the cable Company to the cable office, without having to go through the Western Union main office, but with the understanding that if these cablegrams should contain anything affecting the Western Union, in any way, it would be the privilege of that company to inspect them; and that all cablegrams received from the other side are sent direct to the Western Union main office, and from there distributed. This information, Mr. Garrett goes on to say, was derived from Mr. C. W. Price, the New York manager of the Baltimore & Ohio Company, who had made the inquiry. He submits a statement from Mr. Price, in which the latter sets forth that on receipt of the instructions to make the inquiry he went to the office of Mr. Ward, superintendent of the Direct Cable Company, but was informed that Mr. Ward was not in the city. He then went into the receiving department, and finding a gentleman there whom he knew (and whom he has since named as Mr. Fleming), he made the inquiry of him, and received the reply we have given above. Mr. Price is positive that he was not mistaken in the language, because Mr. Stewart, who was waiting near by, took it down in writing, at Mr. Price's dictation, a very few minutes after the conversation. At a later period (about Sept. 6), Mr. Price was able to see Mr. Ward, and renewed the inquiry to him. Mr. Ward's statement was to the effect that while he had general supervision over the cable department, all cablegrams were handled from No. 16 Broad street, by operators employed and paid by the Western Union Company, and that all cablegrams would have to pass through that office, [illegible] to inspection by officials of that company. Mr. Ward expressed a desire that an interview should take place between President Pender, who was then in this country, and President Garrett.

Having submitted these extracts from letters from Messrs. Stewart and Price, Mr. Garrett goes on to say that he met Mr. Pender, in October, in Baltimore, and discussed with him fully the foregoing statements. Mr. Pender expressed his conviction of the justice of Mr. Garrett's request that the Baltimore & Ohio Company and others should be allowed to send messages to Europe without their passing through the hands of the Western Union Company, and thought he would be able to make arrangements that would be entirely satisfactory. "President Pender's statement that 'as for the Western Union Company's executive scrutinizing messages, nothing of the kind ever passed my lips,'" says Mr. Garrett, "is absolutely true. In our protracted and frequent discussions of this subject no reference whatever was made by President Pender or myself to the 'executive,' President Norvin Green, of the Western Union Company." Mr. Garrett submits extracts from letters which he subsequently received from Mr. Pender, to the effect that he expected to establish a cable office in New York, at which the different cable companies would have a counter, and through which the different inland companies—Baltimore & Ohio, Mutual Union, American Rapid, etc.—might send their messages by any transatlantic company they might choose to select. Still later, however, Mr. Pender wrote to Mr. Garrett that he had been unable to get the Western Union Company to adopt his policy, and added that, although that company had put forward his name as one of its directors, he should not consent to the proposition unless his cable policy, of giving all the inland lines equal accommodations, were adopted. At that date, Oct. 16, it was under consideration.

This closes Mr. Garrett's statement, and he leaves the public to decide whether his original assertion was without a shadow of foundation of truth, as declared by President Green.

On Dec. 1, President Green sent to the president of the Corn and Flour Exchange, Baltimore, a second letter, in which he briefly criticizes President Garrett's letter of the preceding day, and submits an affidavit from the manager and each of the clerks of the receiving department at 16 Broad street, to the effect that none of them ever informed Mr. Price that there was any understanding or suggestion that the Western Union Company had, or in any manner claimed or exercised the privilege of inspecting cable messages. Mr. Fleming swears that he had some casual talk with Mr. Price about the manner in which cable messages were transmitted and delivered, but never said anything that could be construed that the Western Union Company, or any person connected therewith, had claimed or exercised any privilege of inspecting or scrutinizing the contents of cable messages. Manager Brown swears that the persons whose affidavits are submitted are the only persons now or since the first day of August employed in the receiving department of the office. He further swears that it is not a fact that all cable messages received from the other side are sent to the Western Union main office and from there distributed; on the contrary, only a small proportion of the cable messages from the other side is sent to the Western Union main office, these being only messages for uptown offices in New York and for points to which the Broad street office has no direct wires.

Here the matter rests for the present.

## Life in the Country.

[*From the New York Sun.*]

Scene—Brooklyn office of the Western Union Telegraph.

Time—Thanksgiving eve, 9:15 P. M.

Citizen (after writing a message to be sent to another part of the city)—How much for this? I want it sent at once.

Telegraph Operator—Can't send it.

Citizen—What do you mean.

Telegraph Operator—I mean you must send it as a letter by a messenger boy. We don't send messages by telegraph to any part of the city after 9 o'clock.

Citizen (in disgust)—Well, Brooklyn is a great city, indeed. Let's see; how many people live here? Half a million, I believe. Five hundred thousand people, and you can't send a telegram after 9 o'clock at night! Oh, this is a fine metropolis, this is. It's nothing but a miserable country village. Good night! (Exit, furious.)

## NEW CLUB RATES.

### SPECIAL TERMS TO EVERYBODY.

Any person desiring to subscribe for THE OPERATOR will remember three things:

*First.*—That in no case can the paper be had on a single subscription for less than $2.00 per annum.

*Second.*—That **five** or more persons may club together and get the paper for the LOW PRICE of $1.50 a year each, postage prepaid.

*Third.*—That to any person sending in a club of **ten** yearly subscriptions, at this low price of $1.50 each, we will mail a copy of the paper for one year **free** and postage prepaid.

☞ Copies ordered in a club will be sent to the same or separate address, as desired, and address will be changed as often as requested without extra charge.

Many of our subscribers, as well as non-subscribers, will doubtless avail themselves of these low terms, and we earnestly ask every one who sees this issue of THE OPERATOR, whether he be a subscriber or not, to make the experiment now of asking his friends to join him in subscribing for the coming year. Let some one in every office draw up a subscription, put his name to it, and then say to his friends in the same town and over the wires: "Join me in taking THE OPERATOR, postage paid, for one year, at $1.50." We believe that from 5 to 100 subscribers could easily be obtained along every railway line in the country on these low club terms. An hour's work would start the ball.

Reader, this low rate is made so that *operators on railway lines and others of small salaries* may not be denied the *weekly visits of* THE OPERATOR. You know the many advantages to the fraternity that would accrue if every one connected with the business read THE OPERATOR regularly. Will you not, then, *lend a hand* toward this result by getting up a club? By so doing you will not only benefit the fraternity, as well as those you induce to subscribe, but you will also help us immensely in widening our field of usefulness.

## The Mutual Union Company's Charter.—Prospects of the Company.

Attorney General Leslie Russell rendered in Albany on Nov. 29 his decision upon the application of William H. Cameron and Jay Gould for authority to begin in the name of the people an action to vacate the charter of the Mutual Union Telegraph Company. He expresses the opinion that the increase of Mutual Union's capital above $1,200,000, the amount named in its charter, was in violation of law, a usurpation of power, and in direct hostility to the statute. On the same basis the five original directors could as well now increase the capital to $100,000,000 and sell the stock on the market. It appears that the original 6,000 shares, issued before the increase, were surrendered for the new stock. It does not appear that any cash was ever paid for any shares, but that nearly the whole of the $10,000,000 of stock, with nearly the whole of an issue of $5,000,000 of bonds, was paid to John G. Moore & Co. for the construction of the line. The Attorney General infers that the whole plant cost about $4,750,000. The stock was evidently regarded as of no value, except to control the company, for a share of the stock was offered for each bond of the same amount taken, and the shares were separately offered at $5 each. If the issue of stock was for genuine legal purposes, why was the capital increased to $10,000,000? If it was paid to the construction company as a genuine consideration for the construction of the lines, why not give the creditor, besides the bonds, the same proportion of the valid shares of the company without increase of the capital stock, in defiance of law? It appears that the whole capital stock of the company, the first 6,000 shares being surrendered, is invalid as issued under a void increase, which affects every share issued, so that it has no stock, no body or vitality.

It seems obvious to him that the action can be maintained. It would be mere evasion to deny the application on the ground that it could not. Therefore he decides that, if the Court approves and the people are properly indemnified, the action should be brought, and if a judgment be directed vacating the charter, the property will be sold or transferred to a reconstructed company or a successor properly constructed as a valid organization and the proceeds divided among the creditors and other beneficiaries, so that the loss will be only of a violated charter.

The decision depressed the price of the securities of the Mutual Union, and was considered to have a favorable effect upon Western Union stock. The officers and counsel of the Mutual Union said that the decision did not alarm them.

According to the New York *Times*, despite this decision a number of merchants and bankers have subscribed over a million of dollars toward the extension of the lines of the Mutual Union Company. President Moore, when asked on Dec. 1 about the truth of this report, said it was literally true, but that it would be premature to announce the names of the subscribers. He said: "We have the assurance of a subscription of $2,500,000. This is intended not only to increase present facilities, but to add largely to the extent of present lines. The receipts last week of the company were the largest we have ever had. Liberal subscription for our lines is offered in every direction, and we could have no better outlook. We shall be able to announce definite news within a very few days."

The *Times* says this money will be expended in the extension of the lines of the company through territory which promises to bring to the company largely increased business. At the present time new lines are being built along the line of the Housatonic Road, in Massachusetts, and in Central New York. On the 12th inst. the company will enter into possession of lines extending from Richmond, Ind., north to Mackinaw, Mich, along the line of the Grand Rapids & Indiana Road. This will add 460 miles to the lines, which already extend in the Northwest to Minneapolis, Minn. The company is now having constructed a large number of "tickers" for use in sending out quotations and news from the various exchanges. The "ticker" used by the company marks with thrice the speed of that now in use by the Gold & Stock Telegraph Company, and is very different in its manner of construction. For the privilege of the floor of the Stock Exchange, for the purpose of obtaining quotations, the company will have to pay $18,000 yearly, the sum now paid by the Western Union Company for a similar privilege. The "tickers" will be ready for use in about two months, and will be distributed for business in New York, Chicago, St. Louis and other commercial and business centres.

## Canadian Notes.

A telephone cable has been successfully laid between Quebec and Levis at Victoria Cove.

Telephonic communication was established between St. Thomas and London, Ont., on Nov. 18.

The Brush electric lamps on the wharves at Montreal have been taken down, now that navigation is closed.

Mr. F. N. Gisborne, superintendent of the Dominion Government Telegraph, has recently been out West looking after the lines in Manitoba.

Mr. O. S. Wood, vice president of the Great Northwestern Telegraph Company, has returned from an extended visit to relatives in New Jersey.

Mr. Charles R. Hosmer, the president and general manager of the Canada Mutual Telegraph Company, was recently in New York on business connected with his company.

Mr. Angus Grant, district superintendent of the Great Northwestern Telegraph Company, was recent elected honorary permanent president of the Montreal Snow-shoe Club.

Mr. William Cassils, president of the City and District Telegraph Company, sang "Bonnie Doon" at the Banquet in Montreal, on St. Andrew's day, and was joined by the company.

Montreal needs some energetic electric light men to wake up its citizens to the value of this great improvement. The large Bonsecour market, the French church, cathedral and large public squares should be thus lighted.

It is said that the European, American, Canadian & Asiatic Cable Company will be an accomplished fact next summer, and the Dominion will then have direct telegraphic communication with the Continent. It would not be a matter of great surprise if an amalgamation took place between the new company and that of the Garrett-Bennett Baltimore & Ohio cable enterprise.

A communication was read in the Montreal Corporation from the Bell Telephone Company stating that they intended to commence experiments with cables carrying one hundred wires, which would reduce the number and size of poles required to carry the lines. The company asked permission to erect three small poles on St. Alexis street for this purpose. The request was granted.

The telephone in Montreal is every day increasing its usefulness, under the able management of the manuging director, Mr. Sise. The company has instituted a valuable use of its instruments. Subscribers who employ night watchmen can have the fidelity of their service proved by the watchmen calling up the clerk at the central office at every hour of the night. Already cases of remissness have been detected in this way where no other means would have been efficient.

The first shipment of the Thomson-Houston Electric Lighting Company's appliances has arrived in Montreal. The company is under contract to light the principal stores on St. James and Notre Dame streets by the second week in December. A gentleman who contemplated giving the company a large order has just returned from New York and reports that the company's light is the best of fifteen lights he examined. Extensive works are to be erected on the canal bank for the manufacture of the machines in Montreal.

Large quantities of rice lay scattered over the floor of the Bonaventure Depot, Montreal, one day recently, and in answer to the question as to what it meant, it was ascertained that Mr. O. W. Pease, formerly of the operating department of the Montreal Telegraph Company, in Montreal, and now of the Western Union Company, New York, had led to the altar Miss Susan Munro, long known in connection with the Montreal Telegraph Company's operating department in the city. The happy couple were accompanied to the depot by a large number of their friends, and left by the Delaware & Hudson train for New York. The time-honored custom of throwing rice after the bride and bridegroom was carried out to the fullest extent, and accounted for the somewhat superabundant quantity of that very typical and nutritious article of diet and commerce as well as luck, seen on the depot floor.

At the annual meeting of the Great Northwestern Telegraph Co., of Canada, held in Toronto, on Nov. 29, an exhaustive report was presented indicating the operations of the company during the year. The chief work appears to have been that of repairing and renewing the property leased from the parent companies, extension of the lines and other matters of less importance. It is claimed that all dividends for leased lines have been promptly met. The condition of the company's affairs is represented as being greatly improved by the legislative action taken at last session of Parliament. The company has not, however, availed itself of the provisions of the Consolidation Act, in consequence of the continuance of litigation. Allusion was also made to the proposed cable through Lake Superior, and the matter was fully discussed without, however, any conclusion being arrived at. The difficulty regarding the cost, maintenance and capacity of a cable seems to be the long stretches of land lines at both ends of the cable. The necessary action to raise funds for the laying of a cable was, however, taken, in case it was so decided by the directors, the charter of the company containing ample provisions for undertaking the work without recourse to legislation. After the meeting of shareholders the following officers were re-elected for the ensuing year: President, Erastus Wiman, of New York; vice-president, William Gooderham, of Toronto; and the following directors: Messrs. O. S. Wood, Montreal; Hon. W. McDougall, Ottawa; D. H. Bates, New York; Adam Brown, Hamilton; James Hedley, Toronto; A. S. Irving, Toronto; Richard Fuller Winnipeg and Hamilton.

### The Mutual Union Pool.

On Nov. 29, in Supreme Court, Chambers, Judge Barrett heard argument upon a motion to continue the temporary injunction in the suit brought by the Western Union Telegraph Company and Jay Gould against John G. Moore & Co., George F. Baker, George William Ballou and others, to restrain the defendants from carrying out an alleged conspiracy to thwart the carrying out of an agreement entered into between the plaintiffs and the firm of John G. Moore & Co., in behalf of the defendants, in July last. There were present on behalf of the plaintiffs Messrs. Roscoe Conkling, Wager Swayne, Burton N. Harrison and Clarence Cary, and for the defendants Messrs. Ashbel Green, Robert Sewell and William G. Gulliver.

Mr. Harrison stated the substance of the complaint, which does not differ materially from that which we have previously given, on the occasion of the application for the temporary injunction. The answer of the defendants is also substantially the same as on the former occasion, the principal points being to the effect that there was no understanding in the original agreement with Mr. Gould that he was acting in behalf of the Western Union Company, and that in disposing of his Mutual Union stock to the Western Union Company Mr. Gould violated the terms of the agreement and rendered it void.

Mr. Harrison opened the argument on behalf of the plaintiffs. He argued that the trust referred to was distinctly one conferring the power of sale, and, being founded upon a consideration, it was of an irrevocable character. The existence of associates, he claimed, was distinctly recognized by the terms of the trust paper. This conferred the right upon any one who then was, or might at any time become, a beneficiary to complain of and enjoin any violation of the trust. The proposed agreement to impound for five years part of the stock covered by the trust plainly destroyed the power of sale before its limit had expired, and so violated the trust. Mr. Harrison argued that it was no answer to set up the alleged transfer by Mr. Gould to the Western Union Company, the terms of the trust having left the personnel of the beneficiaries undefined, and thus made the interests assignable subject to the terms of the trust.

Mr. Conkling said they would insist that, Mr. Gould being not only a stockholder and director of the Western Union Company, but a member of its Law and Executive Committees, when he proceeded with the approval and authority of that corporation, to negotiate with the defendants for the withdrawal of the suits referred to, and, in consideration of his action, had obtained the contract to purchase certain shares of stock in the rival corporation, which the defendants say were to be bought for the advantage of the Western Union Company, he had no more power to withhold the fruits of that purchase from the Western Union Company than any trustee had the right to devote to his own use what he had acquired in that character; and he argued that Mr. Gould held a relation to the Western Union Company, well known to the defendants, which made that company the beneficiary under the agreement.

Messrs. Robert Sewell and Ashbel Green argued on behalf of the defendants that the plaintiffs had failed to show any trust which a Court of Equity would respect or enforce. The evident purpose and object of the agreement or pool, he claimed, was a mere speculating scheme, which the Western Union Company could not lawfully enter into, and that, at any rate, any resulting damages were unascertainable in a suit of law, and the case was not one of which a Court of Equity would take cognizance, and if it were not so, the alleged trust was so hopelessly vague and indefinable that the Court would not interpose in the matter.

Judge Barrett reserved his decision.

### The Faure Electric Storage and Light Company.

This new company, of which we gave some account in our issue of Nov. 25, has the exclusive right, under lease from the Light and Force Company of this city, to manufacture and sell the Faure electric accumulators in the States of New York, New Jersey, Maine, New Hampshire, Vermont and all the Southern and Western States and Territories, the rights for the other New England States and for Pennsylvania, Maryland, West Virginia and the District of Columbia, being held by three other companies.

In addition to this the company possesses the rights and patents of a complete system of electric lighting—arc and incandescent lamps and dynamos.

The principal object of the company is the introduction of the Faure accumulators in connection with electric lighting, although not necessarily in connection with the company's own electric light system. The gentlemen interested in the company believe that when the value of accumulators in connection with electric lighting becomes better known, they will come into general use in that connection. As showing the advantage of such use of the accumulators, a gentleman connected with the company says: "250 incandescent lamps, of eight candle-power each, would require a 250-light dynamo, which would only run while the lights were in use. By the use of these accumulators, the same number of lamps could be lighted by a 60-light dynamo, with a motive force of ten horse-powers for fifteen hours a day; so that the first cost is reduced, while steadiness of the light is guaranteed without any necessity for steadiness in the dynamo and the engine. Three engines, of 200 horse-power each are required for 3,000 lights, and have to be run whether all or only half the lights are used. With the accumulators, one engine of 200 horse-power, running all day long, would give a steady current for the 3,000 lamps, and would thus effect a saving in the machinery and in the first cost."

To introduce the accumulators the company proposes to organize sub-companies throughout the country, following the plan that was found so successful in the introduction of the telephone. The gentlemen who are interested in the company have the ability and experience necessary to push it to success, a number of them having been instrumental in the introduction of the telephone in various parts of this and other countries.

The company is incorporated under the laws of the State of New York, with a capital of $2,000,000, divided into 20,000 shares, of $100 each.

The directors are Messrs. H. H. Tallmadge, D. I. Carson, L. C. Tallmadge, Francis T. Morton, John L. Miller, George M. Phelps, Jr., James T. Leeds, Walter B. Whiting, A. G. Davis, James M. Ormes and George C. Wilde.

Mr. H. H. Tallmadge is president of the company, Walter B. Whiting vice president, D. D. Carson treasurer, L. C. Tallmadge secretary, and James M. Orme general manager. The offices of the company are at 234 Broadway, New York

### Club Rates.

The low club rates, whereby five or more persons may club together and get THE OPERATOR every week for a whole year for $1.50, leave no excuse for any one to say that he cannot afford THE OPERATOR. $1.50 is never missed after it has been smoked in cigars. It is a large amount to spend foolishly, but is well spent when it is invested in a subscription to a good newspaper, and the amount will be returned to you several fold *every week* in the information of practical value you will get from THE OPERATOR. It may be difficult to spare $1.50, but little is gained in this world without an effort. The $1.50 that you pay for THE OPERATOR for next year may put you in the way of advancement, and of securing a position, or of taking advantage of some combination of circumstances that may lead on to fame and fortune. You cannot appreciate what you miss by not reading THE OPERATOR *every week*. You certainly cannot possibly fail to derive benefit to the amount of $1.50, if you read it for the next year. Try it. There will be little difficulty or expense in testthe matter. Ask a few of your friends to join you; send in your own and their names for the ensuing year, and you will not regret it. If you can secure *ten* yearly subscriptions at $1.50 each —and you will find no difficulty in doing so, if you only try—you can thus get your own copy every week for a whole year *free* and postage prepaid. If you can't get all the names at once, send them as you get them. Sample copies will be mailed free on application. Send for some and see what you can do.

### The Study of Electrical Engineering.

At the opening lecture of the session in the engineering class of the University of Edinburgh, Professor Fleeming Jenkin said that, when closing the class last session, he had spoken of the desirability of having a course of lectures on electricity, and it appeared that it would not be very difficult to prepare a course which would be exceedingly useful to students in large cities. He found, however, that the development of the science was so great that it would be an exceedingly laborious matter to prepare a course on the subject without efficient apparatus; and after his visit to the Electrical Exhibition in London he became more and more convinced that the delivery of such a course without apparatus, and very expensive apparatus, would be simply time lost. Of the immense importance of lectures on electrical engineering he was more and more convinced, and he had come to the conclusion that a new chair was required for its proper teaching. The developments in the science could hardly be exaggerated, and while at one time scientific men were of opinion that the popular mind was expecting too much from electricity, he suspected that the general popular opinion was coming to be about right. The popular mind erred in supposing that electricity would supersede steam as a motive power. What had taken place was that engines were employed to produce electricity, and electricity afforded us the very best means yet discovered of distributing power. Electricity did not take the place of steam, but it took the [place of cog-

wheels, and of shafting and belting. It took the place of hydraulic machines. Instead of shafting they had a wire from the engine to the machine that required to be driven. It was as a means of distributing power that electricity had become so very important an agent in engineering work. In regard to electric lighting the quality of color and brightness seemed to him to be matters of exceedingly small importance. In these respects it seemed to be much like a slight change of fashion in dress, the newest style of coat being for a time preferred to the older. But there were numerous advantages to be gained in the carrying on of works which it was impossible to carry on by gaslight; while, for domestic purposes, with the incandescent light they had no bad air and very much less heat than from gas, and this was important from a sanitary point of view. After alluding to many of the uses to which electricity could be conveniently applied—such as the carving of stone, the hoisting of goods and to farm-work—the lecturer referred to the importance of having technical classes, with suitable laboratories, for instruction in the principles of electric engineering. Touching on the subject of legislation in regard to electric lighting companies, he remarked that every possible obstruction seemed to be thrown in the way of these companies. This, however, might be attended with good in the long run, because electric lighting companies did not seem to be deterred in overcoming those legal difficulties. If anything was to be done at all in the way of studying electric engineering in the University, it must be well done, and ample apparatus must be provided to enable the teachers in Edinburgh to give as good instruction as could be given in any other town in the kingdom.

### The Postmaster General's Argument.

The report of the Postmaster General, which was laid before Congress on Monday, devotes a good deal of attention to the question of postal telegraphy, the adoption of which is strongly recommended. The Postmaster General thinks the time has fully come when the telegraph and postal service should be embraced under one management. The union of the two services, he says, would improve the postal service in some important respects. It would necessitate the employment of telegraph operators for postmasters in many places, which would result in giving to the administration of not a few offices men who have learned to do one thing in place of those who have never learned to do anything. The necessity for delivering messages would facilitate and gradually draw after it the free delivery of mails in places where free delivery in itself is impracticable. It would also improve and cheapen the telegraph service. Rent, fuel and light for both services would cost but little more than the cost of one. Corporations will seek and ought to have remuneration for cost of administration and interest on the capital invested, and under corporate control the telegraph service cannot be cheap. No one corporation has been, or will be, allowed to monopolize the business; yet competition beyond a certain point cannot be tolerated. When this competition becomes injurious to the companies it is extinguished by the purchase and absorption of the competitor, and the public suffers. Then the people must pay the fees which will yield dividends on the new and on the old capital. No matter how conservative or just may be the management of the purchasing company it will demand from the public dividends on the capital invested to extinguish the rival. The only security capital can have against these recurring raids is to surrender the business to the Government. A still stronger reason why the Government should control the telegraph is found in the fact that it is as potent for evil as for good. In the great commercial centres public stocks, corporate and mining stocks, bonds and the staple products of agriculture are bought and sold daily to the amount of thousands of millions. In all those markets one great telegraph company wags its tongue incessantly. For all those commodities it is the arbiter of prices. Prices go up or down according to its inculcations. Whoever controls its utterances may at pleasure buy a market in which he wishes to sell, or break one in which he wishes to buy. That is an agency much too dreadful to intrust to private hands. In Government hands the telegraph will maintain an exact neutrality between the two fierce parties which, day by day and year by year, contend for supremacy in the markets. In private hands it may become the mere creature, as malignant as mighty, of that party which its owner from time to time chooses to join. If he choose he may give free course to falsehood and if he choose he may imprison the truth. Who else can trade in a market dominated by such a power? It may be objected, and has been, that the measure proposed would largely extend the roll of Federal officials, but it does not become 50,000,000 to shrink from employing 100,000 if they have need for their services.

### The Board of Trade Telegraph Company Enjoined.

A St. Louis dispatch of Nov. 30 says: The Board of Trade Telegraph Company having constructed a part of its line, leading from Chicago to St. Louis, upon lands owned by Wiggin's Ferry Company, this city, without the consent of that company, for the purpose of securing a connection at Brooklyn, Ill., with wires just erected for that purpose on the poles of the Baltimore & Ohio Telegraph Company along the Venice & Carondelet Railroad, leading to St. Louis, the ferry company obtained an injunction from the Circuit Court at Belleville, Ill., restraining both these telegraph companies from constructing or operating a telegraph line over or across the lands of the ferry company. The wires referred to as erected on the Baltimore & Ohio Company's poles along the Venice & Carondelet Railway's right of way, for the special purpose of affording the Board of Trade Company a St. Louis connection, having been strung in violation of the rights of the railway company and against its express orders, an injunction was today obtained from the Belleville Circuit Court, restraining both the Board of Trade and the Baltimore & Ohio Company from connecting wires at any point, by means of which the Board of Trade Company may have a line of telegraph in whole or in part, upon the right of way of said railway company. A lessee of some of the ferry company's lands near Brooklyn has taken down a number of poles of the Board of Trade Company which were placed on his lands without his authority.

The Board of Trade Company, some time since, instituted condemnation proceedings for right of way along the Venice & Carondelet Railroad, but without waiting for the decision of the court in the case took the above action in connection with the Baltimore & Ohio Company, and is now enjoined from further proceeding and the Board of Trade Company is still without St. Louis connections.

### Railway Telegraph Superintendents' Association.

Some twenty-five superintendents of telegraph of prominent railroads in the United States met in Chicago on Nov. 20 and 21 and formed an association, having for its object the improvement of the telegraph service on railroads. The association proposes to meet yearly or oftener, on call of the president, in that city, for the purpose of discussing subjects pertaining to railroad telegraphy, such as how to secure perfect working wires; the best and cheapest method of conducting telegraph lines; train order signals and electric safety signals; electric light and telephones as applied to railroad service, etc. Superintendents of telegraph, chief train dispatchers and chief operators may become members of the association.

Among those present at the meeting were J. F. Morgan, Chicago, Burlington & Quincy; C. S. Jones, Illinois Central; J. H. Hill, Kansas City, Lawrence & Southern; C. Selden and G. C. Kinsman, Wabash; C. W. Hamnond, St. Louis, Iron Mountain & Southern; G. H. Thayer, Northwestern; W. K. Morley, Chicago & Alton; George E. Simpson, Milwaukee & St. Paul; O. C. Green, Northern Pacific; C. C. Weed, Michigan Central; P. W. Drew, Eastern Illinois; N. B. Leonard, Chesapeake & Ohio; H. C. Hope, Chicago, St. Paul, Minneapolis & Omaha; J. W. Fortune, Grand Trunk; R. B. Wolseley, Vandalia; and William Kline, Lake Shore & Michigan Southern.

The following officers were elected: president, W. K. Morley, Chicago & Alton, Bloomington, Ill.; vice president, Wm. Kline, Lake Shore & Michigan Southern, Toledo, O.; secretary and treasurer, C. S. Jones, Illinois Central, Chicago.

A number of members were appointed to prepare papers to be read at the next meeting to be held on the third Wednesday in May.

### Holiday Presents.

Advertisements will be found in the present issue of two handsome books, prepared especially for holiday presents, to which we would draw the attention of the reader. He will also find advertisements of other books suitable for the same purpose. If these are not sufficient we would direct his attention to the jewelry for telegraph, telephone and electrical men, elsewhere announced. Surely some of these will strike his fancy. We might also suggest that one of the most useful and, perhaps, acceptable gifts he could make to a friend, in or out of the profession would be a copy of THE OPERATOR for a year.

According to a Pittsburgh paper the Pennsylvania Railroad Company is about to experiment with a new automatic electric safety signal at Tyrone, Pa., where large numbers of coal trains are run. The device is a wire stretched on poles between signals, which at the entrance of trains upon the sections mark red, indicating "danger," and when the trains pass off the sections restore the white signal. The opening of a switch on a section causes danger to be shown at both ends as well as at the switch. The weight of the locomotive of a train entering a section drives a pin into a socket by which the current is controlled. The cost of putting the new system into operation on a double track line is $500 a mile.

### Chicago Telegraphic Notes.

*To the Editor of The Operator:*

SIR: Many changes have taken place in the various offices since my last. In the Western Union office, Mr. A. J. Mereness has been appointed chief operator of the operating departments. His staff is Mr. D. S. Anderson, first assistant and force chief; Mr. C. H. Kelly, second assistant, and Mr. J. F. Stevely, third assistant. Mr. S. O. Bracken is wire chief, with Messrs. Frank Richardson and Charles Barclay, assistants, and Mr. William Talcott, electrician. On the night force Mr. Lorin Springer still sways the sceptre, and Mr. William Holligan and Mr. W. J. Lloyd are assistants.

In the Mutual Union office, Mr. Edward Patten is chief operator, vice Mr. W. A. Leary, resigned to accept the management of an Iowa telephone exchange. Mr. L. O. McPherson is first, and Mr. Gus Carroll second chief. Mr. Albert Drake is night chief.

Of the Baltimore & Ohio office Mr. Malcolm McCulloch is manager, with Messrs. F. N. Roberts and James Coulter as day and night chiefs respectively.

The obnoxious Sunday rules in the Western Union office have recently been changed, so that operators are obliged to contribute but one Sunday in six, instead of every fifth Sunday. This is the only office in the city where Sunday work is not paid for extra.

The sporting men of the Western Union office have recently had a series of shooting matches for a gold medal. It was won three successive times by Mr. F. S. Kent, operator for *The Times*, and is now his. He wears it with much grace.

The Brotherhood is growing rapidly here and in the West generally.

Thanksgiving day was observed in the usual manner here.

Among the late arrivals are Mrs. Stafford, returned from Boston; Mrs. Belle Fleming, from an eight months' absence; Mr. C. J. Lewis, from Kansas City; Mr. Hughes and Mr. Watts, from St. Paul; Mr. Peter Cannon, lately of Louisville, and many others.

During the past two weeks, under orders from the superintendent's office, several men have been dismissed for comparatively slight offenses or errors. In one case, the victim was in no way responsible. It is reported that it is intended to make this a rule, and many men are arranging to leave, rather than work with the sword of Damocles over their heads. I shall refer to this subject later on.

The Western Union Company is preparing to increase the capacity of its wires, and possibly providing against future emergencies, by introducing the Wheatstone system on heavy circuits. A class of about thirty, mostly ladies, is practicing in the punching room.

Miss Daisy Gardner, long of the Western Union, is now manager of the Baltimore & Ohio, at 65 Washington street. P.

CHICAGO, Dec. 1, 1882.

### Thanksgiving Day in Boston.

*To the Editor of The Operator:*

SIR: The telegraph messengers of this city were not forgotten when all the good things were passed around on Thanksgiving day. At noon 150 of them congregated at the Crawford House, anxiously awaiting the arrival of the hour when they would be "let loose" among the roast goose and other good things, and the manner in which they bared the wish-bones and drumsticks leaves little doubt but that there was "fowl" play in earnest. It was indeed a happy gathering. Each wore his best clothes, assumed his good behavior, and with bright and cheery faces discussed the numerous and palatable viands displayed upon the festive board, and all were glad, for once, at least, that they were messenger boys. In an adjoining room the senior attachés of the delivery department, together with Superintendent Roche, Night Manager C. F. Leighton; Chief of Delivery Murphy, and Manager McGrath, of 31 State street, also indulged in a bountiful repast. Michael J. Toomey and James C. Ruhl were instrumental in securing the funds necessary to defray the expense of the dinner for the boys, through the generosity of merchants and others. At the conclusion of the dinner the two above-named gentlemen were with white and black stone, Mr. Leighton making the presentation speech with a few well-chosen and appropriate words.

Mr. Frank S. Viles, formerly of New York, is here on the night force. Mr. F. T. Kinney, of New York, is in town. Mr. O. L. Barron has been appointed night chief of the city line department, vice Mr. E. J. O'Connor, resigned.

BOSTON, Dec. 1, 1882. UKNO.

### New Edition of Lightning Flashes.

A new and revised edition of the above popular work has just been published. "Lightning Flashes" is the book to which all the bright lights in the ranks of telegraphic literature have contributed articles well worth reading. It is also copiously illustrated, principally by members of the telegraph profession. "Lightning Flashes" is an exceedingly cheap book at the reduced price of $1. It has always been very popular, and, as now revised and republished, ought to have a still larger sale. See advertisements in to-day's issue.

## THE ELECTRIC LIGHT.

The new Bijou Theatre in Boston is to be lighted throughout by electricity.

The Empire Electric Light Company was incorporated at Albany, on Dec. 1, with a capital of $100,000.

In his speech at the meeting held in New York last week, for the purpose of stimulating public interest in the erection, upon Bedloe's Island, New York Harbor, of the pedestal for Bartholdi's statue of "Liberty Enlightening the World," Mr. Evarts said: "What a stupendous structure it will be, 300 feet high, with its torch blazing with electric light, and a crown of stars about its head, to be seen miles away, at sea and by land, and ever to be in the gaze of the millions that fill these near cities, as if a meteor had been arrested in its rush through our air and fixed upon the upraised hand of this statue!"

Some newspaper scribbler having asserted that the Edison Company was troubled at its Pearl street station, in this city, with "a loss of current, due to the resistance of the long circuits," and that whereas Edison gets "six, or even seven lights to the horse-power in isolated plants, the resistance of the long underground wires reduces that result in the Pearl street station to less than three lights to the horse-power," Major S. B. Eaton, president of the Edison Company, denies the truth of both assertions. As to the loss of power due to the resistance of the conductors, he says the results obtained have fully demonstrated the correctness of the estimates made of this when the original plans were drawn. "As regards our getting only three lights per horse-power," says Major Eaton, "our station has now been running three months, without stopping a moment, day or night, and we invariably get over six lamps per horse-power, or substantially the same as we do in our isolated plants. We are now lighting 193 buildings, wired for 4,400 lamps, of which about two-thirds are in constant use, and we are adding additional houses and lamps daily. To light these lamps we run from one to three dynamos, according to the lamps in use at any given time, and we shall start additional dynamos as fast as we can connect more buildings. Neither as regards the loss due to resistance, nor as regards the number of lamps per horse-power, is there the slightest trouble or disappointment on the part of our company."

## TELEPHONE DEPARTMENT.

Mr. Randolph Morris has taken a position with the Met. T. and T. Co., in this city, as test operator.

Telephone matters are dull, the cold weather and snow storms having put a stop to construction for the present.

Mr. W. P. Fuguiel, of the Met. T. and T. Co. lightning, on Sept. 23, and fractured his thigh and wrist, is able to be about again.

The United Telephone Company, of Great Britain, has obtained another injunction for infringement of its patents. There is no question, says the *Mechanical World*, that the company intends to maintain the rights it claims to possess.

Mr. Dorman Bristol, formerly a superintendent of construction of the Western Union Telegraph Company and widely known throughout the country, has accepted a similar position with the City and Suburban Telegraph and Telephone Company, of Cincinnati.

The City and Suburban T. and T. Co., of Cincinnati, has just completed the placing of an aërial telephone cable between that city and Newport, Ky. The cable was made by the Western Electric Company, is 2,000 feet long and contains 50 conductors. It is said to work excellently.

## DASHES HERE AND THERE.

If you want to become a telegraph operator send 25 cents to C. E. Jones & Bro., Cincinnati, for best illustrated instruction book.—*Advt.*

Those who do not preserve their OPERATORS will much oblige by sending their copy of this issue to some non-subscriber—preferably *not* a Western Union manager—drawing his attention to the paper and the low club rates, and if possible getting us his subscription.

Telegraph, telephone and electric light stocks were quoted as follows on Tuesday and Wednesday, the first three being the closing quotations on Wednesday:

| | |
|---|---|
| Western Union Telegraph | 81⅛ |
| Mutual Union Telegraph | 22 |
| American Cable | 66¼ |
| American Bell Telephone | 176 |
| Edison Electric Light | 100 |
| United States Electric Light | 112 |
| Fuller Electrical | 30 |

The Mutual Union Company has won a victory over the Western Union at Dayton, Ohio, in the suit brought by the former company some time ago to compel the Western Union Company to receive messages from the hands of the Mutual Union destined for points not reached by the Mutual Union lines. On Dec. 4, Judge Dennis Dwyer, of the Superior Court, made perpetual the mandatory injunction restraining the Western Union Company from discriminating against the Mutual Union. This is the first decision on this question rendered by a United States judge.

We present in this issue a number of Canadian notes which we hope will be found of interest. Now that THE OPERATOR is issued weekly, we shall be able to give more attention to electrical matters in the Dominion, and will be obliged to any of our readers in that section who will call our attention to matters of interest that might perhaps escape us, or that they may see in the local papers. We would also be glad to have our Canadian readers call the attention of their acquaintances engaged in telegraphic or electrical pursuits to this, and to the low price of the paper.

Mr. Charles E. Buell, of Washington, who has been for two years compiling information on the subject of secondary batteries, has put into a book the results of his researches. Mr. Buell says he has found much information hitherto overlooked or forgotten by electricians. He has descriptions of storage batteries charged by light, by frictional electricity, by atmospheric electricity, by the earth, and two forms that charge themselves. Mr. Buell thinks the republication of these experiments may be of use to electricians and inventors. An advertisement of his book may be found in another column.

The Mutual Union Telegraph Co. has been establishing a number of important branch offices in Boston. Among others, it arranged, by agreeing to pay a rental of $200 a year, to open an office in the International Hotel, where the Western Union Company has had an office without a lease. The proprietor of the hotel accordingly notified the Western Union Company to withdraw. Mr. J. J. C. Wilson, of the latter company, undertook on Dec. 1 to maintain possession of the office notwithstanding the notice to quit. He was forcibly ejected by the proprietor, and at last account the Mutual Union Com-

Negotiations which have been in progress for some days were concluded on Dec. 5 by which the telegraph lines along the route of the New York, Chicago & St. Louis (Nickel Plate) road will be operated in connection with the Mutual Union Telegraph Company's system. The only matter yet to be arranged is the adjustment of the division of profits, and these arrangements will be completed within a day or two. The managers of the Mutual Union, on Dec. 5, secured the assent of Vice President Brice, of the Nickel Plate Company, to the arrangement. The telegraph lines along the road were not purchased by the Vanderbilt syndicate when they purchased the road itself.

President Arthur does not approve of the Postmaster General's recommendation of a postal telegraph. He says in his message to Congress: "From this last and most important recommendation I must withhold my concurrence." The President also refers to the recent electrical congresses in Paris. He says: "The protection of submarine cables is a subject now under consideration by an international conference at Paris. Believing that it is clearly the true policy of this Government to favor the neutralization of this means of intercourse, I requested our Minister to France to attend the convention as a delegate. I also designated two of our eminent scientists to attend as our representatives at the meeting of an international committee at Paris for considering the adoption of a common unit to measure electric force. In view of the frequent occurrence of conferences for the consideration of important matters of common interest to civilized nations, I respectfully suggest that the Executive be invested by Congress with discretionary power to send delegates to such conventions, and that provisions be made to defray the expenses incident thereto."

## NEW YORK CITY ITEMS.

### Echoes from 195.

Mr. C. H. Miller has gone to Chicago.

The wife of Mr. D. H. Debaum died recently.

Mr. A. E. Hughes of the Albany quad is at home sick.

Mr. O. K. Newton has drawn some excellent maps of the eastern and western wire routes.

Mr. Jos. L. Edwards, Washington printer operator, has been at home sick for over a week.

Mr. Bennett, the light weight of the office, has returned from Glens Falls, N. Y., where he has been receiving night press reports.

Mr. J. S. McClelland has gone to St. Catharines, Ont., to attend the funeral of his father, who was killed on the 5th inst. by being thrown from a buggy.

Receiving the President's message with chiefs, managers, assistant general superintendents, Associated Press agents, etc., standing around, is quite an ordeal to the nerves of some operators, and two first-class men succumbed to the influence on Monday, requesting to be relieved before the message was started.

Mr. S. C. Haines, with a party of friends, visited 145 a few days ago. Mr. Haines was an operator in old 145 Broadway, but left the service to engage in more congenial pursuits. He is now a director of the Brooklyn District Telegraph Company, and is connected with several other telegraph and telephone companies. He is reputed to be wealthy.

The reception of the President's message caused a flutter on the morning of Dec. 4. It was received on 10 wires by 20 operators, in an average time of 50 minutes 40 seconds. Each operator took 10 copies; thus there were received 20 copies of the message, which contained about 13,000 words, in the time mentioned. The order had been given in Washington that there should be no "rushing," consequently the copies were, as a rule, better than usual.

### Other City Items.

The ball of the resident telegraphists of Brooklyn, on Tuesday night, was a very successful and enjoyable affair, some 200 couples being present. Most of these were from Brooklyn, although New York was well represented, and there were one or two from other cities. Congratulatory telegrams were read from Pittsburgh, Chicago, Buffalo, Kansas City, St. Louis, Philadelphia, San Francisco, Toronto, and other prominent places.

## PERSONAL.

Mr. C. L. Healy has resigned his position as electrician at Yreka, Cal., to attend to his interests with Mr. F. B. Rae in electric lightning at San Francisco.

The Providence *Press* compliments manager C. J. Sheehan, chief operator P. J. Hurlburt and operators J. F. Moran and F. F. Osborne, of the Western Union office, on the manner in which they handled the President's message on Monday. The message was commenced at 11 A. M. and the signature was received at 1:18 P. M., the whole message being ready before the first edition of the papers went to press.

The President's message was received in Boston by Messrs. Bradford, McCarthy, Holland and K. N. Kenna. Mr. E. L. Beard, agent of the Associated Press, compliments them highly, saying that the message had never been better handled. They were also complimented by the chief operator in New York, on the rapid time made. A correspondent remarks that while such compliments are gratifying to the recipients they do not go very far toward providing coal or paying house-rent.

Robert Lewis, familiarly known as Bob, a colored man, who for twenty-three years was a telegraph lineman at Macon, Ga., died at that place on Nov. 15. The Macon *Graphic* says: "Bob was well known in Macon and along the lines of the telegraph. He had never failed to be at his post. No weather, whether freezing, storming or freshets, ever kept him from his duties. He was first to find a break in the wires and last to leave his work of repairing, though he was often to his armpits in mud and water, and the water freezing around him. So acute was his vision that he never failed to find a cross in the many wires strung upon the same poles, and he could attend the batteries with the precision of a skilled electrician. He died poor, but worthy, in the memory of all who knew him."

## BUSINESS NOTICES.



## BORN.

COYLE.—On Sunday, Dec. 4, 1882, to Frank E. Coyle, chief clerk to General Superintendent Tinker, of the Western Union Company, New York, a daughter.

## MARRIED.

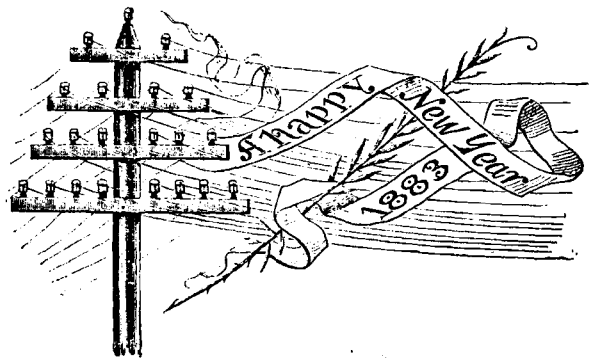
COLTART—PATTERSON.—At Grace Episcopal Church, Memphis, Tenn., on Nov. 21, Mr. Harry G. Coltart, train dispatcher M. & T. R. R., to Miss T. Patterson.

FURRY-SMITH.—On Nov. 23, 1882, at the residence of Capt. H. H. Brown, Akron, O., Mr. Frank W. Furry, Agent Valley Railway, Akron, to Miss Lydia W. Smith.

## ELECTRICAL PATENTS ISSUED.

*Week ending Nov.* 28, 1882.

Apparatus for charging electric storage batteries; V. W. Blanchard, New York, N. Y. 268,175
Condenser for telegraphic circuits; B. Thompson, Buffalo, N. Y. 268,317
Dividing and branching electric cables; R. S. Waring, Pittsburgh, Pa. 268,324
Dynamo-electric machine; R. H. Mather, Windsor, Conn. 268,255
Dynamo-electric machine; E. Weston, Newark, N. J. 268,331
Dynamo or magneto-electric machine; T. A. Edison, Menlo Park, N. J. 268,205
Electric-arc lamp; A. Graham, London, England. 268,218
Electric-arc lamp; E. J. Harling and E. Hartmann, London, England. 268,224
Electric-arc lamp; J. McLaughlin, Chicago, Ill. 268,038
Electric-arc lamp; R. H. Mather, Windsor, Conn. 268,254
Electric-arc lamp; S. F. Van Choate, New York, N. Y. 268,155
Electric cable; R. S. Waring, Pittsburgh, Pa. 268,060
Electric cable; R. S. Waring, Pittsburgh, Pa. 268,157
Electric generator; V. W. Blanchard, New York, N. Y. 268,174
Electric incandescent lamp; J. V. Nichols, Brooklyn, N. Y. 268,269
Electric incandescent lamp; J. V. Nichols, Brooklyn, N. Y. 268,270
Electric incandescent lamp; T. A. Edison, Menlo Park, N. J. 268,206
Incandescent lamp holder; E. Weston, Newark, N. J. 268,329
Incandescent electric lamp holder; E. Weston, Newark, N. J. 268,330
Increasing and reducing joint for electric-wire conduits; C. Linford, Pittsburgh, Pa. 268,031
Lead-armored electric cable; R. S. Waring, Pittsburgh, Pa. 268,158
Magneto-electric machine; O. Heikel, Jersey City, N. J. 268,099
Manufacture of insulating compounds; M. Mackay, London, England. 268,034
Printing telegraph; A. F. and F. B. Johnson, Brooklyn, N. Y. 268,237
Secondary battery; A. K. Eaton, Brooklyn, N. Y. 268,360
Secondary battery; E. T. and E. E. Starr, Philadelphia, Pa. 268,308
Submarine electric cable; R. S. Waring, Pittsburgh, Pa. 268,059
Telephone exchange system and apparatus; J. H. Rogers, New York, N. Y. 268,294
Telephone toll apparatus; J. W. See, Hamilton, O. 268,045
Telephone apparatus; W. J. Dudley, Boston, Mass. 268,359
Uniting and branching electric cables; R. S. Waring, Pittsburgh, Pa. 268,159




This is an illustration of the

TELEGRAPH NEW YEAR'S CARD

FOR 1883.

Of course it does not look as well here as it does carefully hand-printed on the heavy cream-tinted cards; but it can readily be seen from the above that the design is handsomer and neater than any of its predecessors.

# The Operator as a Weekly.

Believing the time to have come when electrical science in America should be represented by a *WEEKLY JOURNAL*, and in response to a very *wide-spread demand from subscribers*, the Publisher, with the number for October 14th, 1882, began to issue *THE OPERATOR once a week*, instead of semi-monthly.

By this means we are able to furnish our readers *a great deal of interesting matter* that it was *impossible to give in our former limits*. For a long time before the change, there was not an issue of *THE OPERATOR* from which we did not have to *omit* interesting and valuable articles for *want of space*. *The advancement of electrical science has become so great and rapid that it is impossible for a journal published only twice a month to keep up with it.*

In taking this step, we felt that we could confidently rely upon receiving the *continued support of the telegraph, telephone and electrical workers of America*, who have never yet failed to respond to our efforts in their behalf. We believed that they were *alive to their interests*, and to the importance of *keeping step with the progress of electrical research*. The result has shown that we were *not mistaken*. The weekly has been hailed with *the most gratifying enthusiasm* by telegraph, telephone and electrical men *of every rank and position* throughout the United States and Canada, as well as abroad. The circulation is *larger to-day than it has been at any time since the paper was established*, and the *increase during the present winter* promises to be *much greater than during any previous one.*

No one who will compare the little four-page *OPERATOR* of eight years ago with the *weekly OPERATOR* of to-day, with its many pages filled with varied and interesting matter, can say that it has not *kept pace* with the *development of electrical science* during that period. We are anxious, however, to make it *so good* that *no one* whose daily life is associated with *electrical work* can *AFFORD to do without it;* and in issuing it more frequently we are able, without making the paper any less entertaining than it has been hitherto, to give much more *matter of permanent value*. We are also enabled to give many items of news and current interest, as well as illustrations of new inventions and the like *promptly while the subjects are fresh.* For these reasons *THE OPERATOR* is not welcomed less, but rather more heartily for coming often, and no effort is spared by the Publisher to render its weekly visits *indispensable to all interested in telegraphy, telephony, electric lighting and electricity in general.*

## Enlarging the Size.

Not only has *THE OPERATOR*, true to its record of *keeping well up with the times*, been compelled to increase its frequency of issue, but, commencing with the first number in 1883, it will be permanently *enlarged to the*

**Size of The Scientific American,**

and will contain *every week the same number of pages* as does that journal.

This fidelity, we are sure, will be fully appreciated by those who have watched and admired the progress of *THE OPERATOR* in the past. We need scarcely add that in the enlarged and more frequently issued *OPERATOR* the same old standard that has characterized it heretofore will not only be maintained but we shall be ever on the alert to *introduce further improvements* and to *render the paper more and more interesting, instructive and valuable to all classes of readers.*

# A WARM INDORSEMENT

— OF —

# THE OPERATOR.

Mr. JOSEPH CHRISTIE writes an indorsement of the course of *THE OPERATOR* which we have not the modesty to withold from publication

Mr. CHRISTIE'S long and wide experience in the telegraph business and in the Associated Press; his intimate knowledge of the spirit, tone and make-up of American journalism, in addition to his experience as a telegraphic editor and contributor, give his opinion additional weight.

He writes: "Since you have asked my opinion as a disinterested party, I have no hesitation in saying that *I am very much pleased with the course of THE OPERATOR.* I am glad to see that its promise to keep abreast of the times is *being kept*, as the change from a semi-monthly to a weekly and the promised enlargement of the paper shows. This is ample evidence to me that it has *acquired an influence* in all circles which its *straightforwardness* and *faithfulness* to the *interests* of the Telegraph well merited. *THE OPERATOR* has made *an heroic fight for the operator*, but it seems to me that much of its success has been due to the fact that its *scientific articles* have always been written with a *simplicity* which has *commended itself* to the least informed upon electrical subjects; while the *vigor* of its *arguments* has commanded the *attention* and *respect* of every one.

"From its first issue, as a small four-page local paper, in 1874, to the present valuable and instructive form—keeping pace with the grand inventions of the quadruplex and the telephone, and the great improvements in the electric light—*I have looked principally to THE OPERATOR for my information;* and, to me, it has been the *plow-share that turned up buried facts*, and the *pole-star which pointed out the telegrapher's true path.* Some of my *first knowledge of the intricacies of the duplex and quadruplex* were derived from articles (written, I believe, by Mr. Edison) and diagrams *in its columns*, and now *there is not an issue comes to me but what I learn something about our science.*

"But *THE OPERATOR* has done *more than instruct* its readers, it has *revolutionized telegraphic journalism.* It has exploded the old-fogy notion that a telegraphic paper should print *nothing but perplexing problems in algebra and cube-roots*, lengthy and solemn dissertations on quantities and resistances, and the scientific estimates of the sag in a given length of wire. It found food for reflection in the *daily life of the toiling operator*, and sermons in their hum-drum experience; it held the mirror up to us for the first time and sang to our willing ears in dithyrambic strains of the virtues of Giovanni Purissimo Morosini; gave us the plaintive pleadings of Col. John Lenhart, the quiet, modest and graceful soldier-telegrapher; made the *profession familiar, each member with the other;* and, in fact, gave a *readable journal* to those who like to be amused occasionally by a well-told descriptive story of telegraphic life, in which our happy-go-lucky profession is so particularly rich.

"In continuing your prosperous course, I hope that you will remember the saying of De Tocqueville: "*A newspaper can drop the same thought into a thousand minds at the same moment.*" It has a *great influence for good or evil.* It is a mirror held up to the profession, but it must be a discriminating mirror. I *hope* that *THE OPERATOR* may *continue in its present judicious and prosperous state, read and appreciated by all.*"

## What Subscribers say of THE OPERATOR.

"It is *truly* a *splendid* paper." A. J. F., Washington College, Washington, Cal.

"I must have *THE OPERATOR*, if it cost twice two dollars."
A. M., Guelph, Ont.

"*THE OPERATOR* is received regularly and is a God-send."
C. E. C., Tampico, Mex.

"'I cannot get along without *THE OPERATOR*,' so say all the boys out here."
W. D. F., Boise City, Idaho.

"I would not be without *THE OPERATOR* for $10.00 *a year*."
A. A. C., Beaver Lake, Mich.

"I think *THE OPERATOR* has improved very much in the last two years."
J. W. S., Mission, San Jose, Cal.

"Am very glad to see a weekly made out of *THE OPERATOR*. *Success to the venture*."
C. D. W., Galion, Ohio.

"I find *THE OPERATOR* very instructive. It is a paper that all operators should have."
J. H., Bradford, Pa.

"Your paper is a valuable assistant to every manager and operator, and none should be without it."
G. M. M., Plymouth, Ohio.

"Notwithstanding am not telegraphing at present I cannot get along without *THE OPERATOR*."
ALICE C. H., Avoca, Iowa.

"Although I am not in the telegraph business now, I feel that I must have *THE OPERATOR*."
F. H., Winnipeg, Man.

"I have not seen *THE OPERATOR* for some months, and feel out of the telegraph and telephone world."
L. A. R., Marine, Ill.

"Please continue my subscription for *THE OPERATOR* for another year. I cannot get along without it."
J. F. W., Baileys, Col.

"Have been for some little time without *THE OPERATOR*, and I feel so lost that I must subscribe for another year."
P. M. C., Palestine, Tex.

"I observe in *THE OPERATOR* to-day that hereafter 'our' paper is to come out every week. *I am very glad of it*."
J. G. W., M. U. Tel. Co., N. Y. City.

"Imagine my surprise as well as my joy to hear that *THE OPERATOR* is now to visit us every week. *I wish it much success*."
T. M. G., Fitzpatricks, Ala.

"Have been reading my 'pard's' copy of your valuable and warm advocate of our cause, but desire to have a copy of my own."
C. M. B., Mountain Top, Pa.

"If every telegraphist in the land would read *THE OPERATOR*, we could in a very short time note the result in the bettering of our condition."
E. N. R., Otto, Ill.

"I find *THE OPERATOR* very valuable in respect to general information on electric science and advancement, in which I am much interested."
H. C. B., Supt. Telephone Exchange, Meadville, Pa.

"Allow me to say that you are sending out a paper that must be of great value to all who are engaged in either the Telegraph or Telephone business."
GEN'L MANAGER UNION TELEPHONIC EXCHANGE CO., Norwalk, O.

"I am much pleased to see *THE OPERATOR* come to us weekly, and wish you unlimited success. *I do not see how the fraternity would get along without it*.
W. B. L., Walker, Mo.

"Success to *THE OPERATOR*. It is a *welcome guest to all operators who take pride in their profession*, and has my *hearty sympathy* in its fight against monopoly and wrong.
A. E. T., Williamsville, Mo.

"Albany sends greeting to the weekly *OPERATOR*, and congratulates the Editor and Proprietor upon this evidence of its prosperity. *It is the only Operators' paper published*."
"A.," Albany, N. Y.

"I am glad to see the advance you have made in giving us a weekly, which is, I think, a sufficient guarantee that we may look for good things in the once little *OPERATOR*.
A. T., Peterboro, Canada.

"I admire *THE OPERATOR* very much. Think all the boys out here like it better than any other paper of its kind, judging from the high praise it receives. It is becoming very popular with us."
L. S. P., Ogalalla, Neb.

"I first began taking *THE OPERATOR* two months ago; but one copy was enough to convince me that it was what I had long wanted, and you can count on me as a constant subscriber. Success go with you."
C. A. S., West Union, Minn.

"I am glad to hear that you have decided to make a weekly of your paper, and hope that *as a weekly it will lose none of its merit as a semi-monthly*. When my subscription expires please inform me and I will renew it.
C. M. W., Omaha, Neb.

"I seize the present momentary lull in business to express my entire satisfaction with *THE OPERATOR* as a representative journal, and to thank you for the many pleasant hours afforded by its perusal during the past year."
W. K. W., Newport, Ark.

"Though no longer in the business, I still take a lively interest in all things telegraphic, and find *THE OPERATOR* a better guide than any other paper published, as from it I can keep informed of the electrical news of the day."
E. M. G., Cincinnati, Ohio.

"And *THE OPERATOR* is to be issued as a 'weekly' hereafter? Zounds! Ye Gods!! What a *splendid 'dash' in the right direction*. If you do not drop a 'dot' right here, we shall conclude that the end is not yet reached but that *in due time we shall know you as a*

# THE OPERATOR,

A JOURNAL FOR

# TeLegraphists, Telephonists and Electricians.

## PUBLISHED EVERY SATURDAY.

THE OPERATOR, now in its THIRTEENTH VOLUME, is devoted to Telegraphic news, commercial and railway branches, social as well as scientific, and also gives prominent attention to

TELEPHONY AND ELECTRIC LIGHTING,

having a separate department for each of these important Outgrowths of Telegraphy. It is a record of the wonderful growth and progress of the telegraph, the telephone and the electric light and a chronicler of the changes and improvements in electrical science. It is

A STALWART, UNCOMPROMISING JOURNAL.

Its cardinal principles are honesty of purpose, integrity in business affairs, courage, independence, genius and industry, and its chief aims are to elevate the profession, to popularize electrical science and to cement the fraternity in one compact body, thus rendering it proof against assault from all quarters. It is

CAREFULLY AND CONSCIENTIOUSLY EDITED.

We regard it as our peculiar province to find out at any cost what is going on electrically, to make it public in a truthful and lucid manner; to expose shams and frauds of all kinds, high or low; to give praise where praise is due, irrespective of prejudice, and to do some courageous and vigorous thinking thereon. THE OPERATOR maintains

INTELLIGENT AND ABLE SPECIAL CORRESPONDENTS

at all important telegraph, telephone and electric-light centres, on the frontier, in Europe and the Pacific Archipelago. As a

SCIENTIFIC JOURNAL

it is unsurpassed, and keeps its readers well up to the ever widening and deepening subject of electrical science. The most advanced electrician will be continually finding something new to learn in its columns. The student of electricity in all its branches will find the subject dealt with with all the clearness and simplicity of a Primer. Avoiding the redundant fullness and dry details of scientific research, it is careful to preserve the important facts in all that is necessary for the scientific student to know. Ever since the introduction of the telegraph, men have been writing voluminously upon electrical subjects, but their efforts have been rather too deep for the ordinary student. Our articles bearing upon the fundamental principles of electrical science are, therefore, written with a special desire to avoid that great stumbling-block to the acquisition of electrical knowledge; to disentangle the multiplicity of knotty questions and to

PRESENT THEM STRAIGHT AND SMOOTH TO OUR READERS,

thus affording the junior members of our profession an opportunity of mastering, in an easy way, the most intricate questions. The wonderful fecundity of our inventors, whose discoveries are following rapidly one after the other, and the great number of gigantic enterprises already projected, present

A WIDE AND PROMISING FIELD FOR THE AMBITIOUS

and promising young man. Now, it stands to reason that the operator or electrician who does not read his class paper must soon become a kind of telegraphic Robinson Crusoe. He must necessarily remain

IGNORANT OF THE PROGRESS OF ELECTRICAL EVENTS,

and it is certain that no one who is badly informed on this subject can ever hope to raise himself above the level of the ordinary ruts of daily life. Therefore, no one who expects to

PROFIT BY THESE ENTERPRISES,

or even to secure for himself a better-paying situation in the thousand and one changes which these new plans, schemes and ever-changing combinations produce,

CAN AFFORD TO MISS "THE OPERATOR" FOR A SINGLE ISSUE,

since he cannot in any other way be made acquainted with his general prospects; and the odd number which he misses may be the very one which would otherwise have given him the hint that led on to fame and fortune. It places before you every week a large number of

REVIEWS AND ESSAYS

of great interest and intrinsic value. And, moreover, it is well known to be

**FIRST, LAST AND ALL THE TIME FOR OPERATORS AND ELECTRICAL WORKERS AND THEIR BEST INTERESTS.**

While it is a well-known staunch supporter of the members of our craft, it is, at the same time, never to be blinded to their faults, if any are found to exist; and, believing it is better to touch and heal, to cast out and chastise those who are unworthy of confidence, it points them out,

NO MATTER WHAT POSITION THEY MAY OCCUPY.

While aiming to expose, and so to correct, all that is deceptive, unjust or corrupt in official life, we do not regard it as productive of good results to the profession at large to give these unpleasant matters undue prominence before an effective effort is made privately to correct them. Its aim is

THE WELFARE AND THE ELEVATION OF THE PROFESSION,

and, while instructing its readers upon scientific subjects, it seeks also to put down Wrong and to put up Right.

But, to the electrical worker THE OPERATOR should need no word of indorsement; for, as the accredited organ of the profession, it has advanced so far in prosperity as to be

**ABSOLUTELY INDEPENDENT OF ALL OFFICIAL INFLUENCE,**

as well as cliques and factions of all kinds. All the traditions, all the history and even the very existence of THE OPERATOR depend upon the great rule of allowing

THE LOWEST OPERATOR AN EQUAL CHANCE WITH THE HIGHEST OFFICIAL

to "speak his piece," and to spread his suggestions and grievances before his superior officer or fellow-workers.

**WHY ALL WIDE-AWAKE OFFICIALS SHOULD READ "THE OPERATOR."**

No official organ of any particular company can ever be of use in guiding the wide-awake official. It is admitted that nothing in the newspaper world could have less influence than an "official organ," since its recognized position and common fame put it in the light of piping always to the same creaking key; and its reports being always colored are consequently utterly valueless as matters of record. THE OPERATOR, on the other hand, looking merely at its independent position, must be an admirable corrective instrument, for the better class on both sides study its reports, and all admit that it is the fairest field for friendly controversy, exhortation, explanation and good-natured criticism regarding all that pertains to the interest of telegraphers. It is, as has been well said of the press in general, like an eruption of Vesuvius—a sort of safety-valve by which ideas and feelings which, if they remained imprisoned, would result in earthquake, are released, ejecting with them a good deal of mere steam, a great quantity of ashes, and a certain amount of lava, that by its crumbling ultimately covers the soil with smiling vineyards and benefits to mankind..

These facts are gradually becoming understood among officials, and the journal which, in a manly, straightforward way, tells them when they are wrong commands their respect. THE OPERATOR is the

ONLY COMPLETE INDEX OF AMERICAN TELEGRAPHIC LIFE,

a continued story of our thoughts and actions as a body, without a knowledge of which any one is unfit for successful telegraph leadership.

**WHY ALL TELEPHONE AND ELECTRIC LIGHT MEN SHOULD READ "THE OPERATOR."**

The progress of telephony and electric lighting has been such, and so many of our very best men have gone over to these branches of our profession, that they demand especial attention at our hands. We maintain, therefore, separate departments devoted to Electric Lighting and the Telephone, their progress and development and every-day news connected therewith. We receive regularly items of this kind from the various telephone exchanges and electric-light companies throughout the country, and engage the best and clearest writers to contribute regular articles upon telephonic and electric-light subjects.

**WHY EVERYBODY SHOULD READ "THE OPERATOR."**

A profession like ours, growing daily, hourly, and with its various branches in the telephone companies, the electric-light interests, the railroads and Signal Service, the working members of all of which are unsurpassed in activity, ingenuity and the importance and effectiveness of their work, should support a FIRST-CLASS, THOROUGH-GOING, INDEPENDENT PAPER, to be spread broadcast over the civilized world.

**TERMS OF SUBSCRIPTION,**

Invariably in advance:

**One Copy, One year, Postage Included, $2.00.**

**Six Months, $1.00; Three Months, 50c.**

**Clubs of 5 or more yearly subscriptions, $1.50 each.**

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*These remarkably low club rates are made for the benefit of operators and others whose salaries are not very high. It is hoped that many who could not conveniently spare $2.00, will take advantage of them and invite their co-workers on the same wire or in the same city or town to JOIN THEM IN TAKING THE OPERATOR AT $1.50 A YEAR.* It is almost superfluous to add that $1.50 for 52 copies does not pay the bare cost of producing the paper. In fact, were it not for the revenue derived from advertising, such a paper as THE OPERATOR would cost at least $4.00 or $5.00 a year.

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In addition to these the book contains, among other interesting matter, two able cartoons, "Two Plugs With But a Single Thought" and "The Quadruplex;" a story, "The Volcanograph," with two illustrations; "A Reminiscence," illustrated, and "Our Night Car," all by Joseph Christie ("Werner"); nearly a dozen cartoons by J. J. Calahan, "An Evening Reverie" and "A Leaf of Autobiography," by W. P. Phillips ("John Oakum"); "The Telegraph Dispatch," by J. D. Reid; "Into the Jaws of Death, A Telegraph Operator's Story," by H. Van Hoevenbergh; "Leander's Tour of Investigation," by D. C. Shaw ("Oney Gagin"); "Wives for Two, or Joe's Little Joke," by E. O. Chase ("Nuf Ced"); "Wooing by Wire," by Miss J. J. Schofield; "Poor Dick," by J. Albert Clippinger; "Some Oxberience Mit a Railroats," by C. E. Watts ("Yosef").

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