TELEGRAPH AGE

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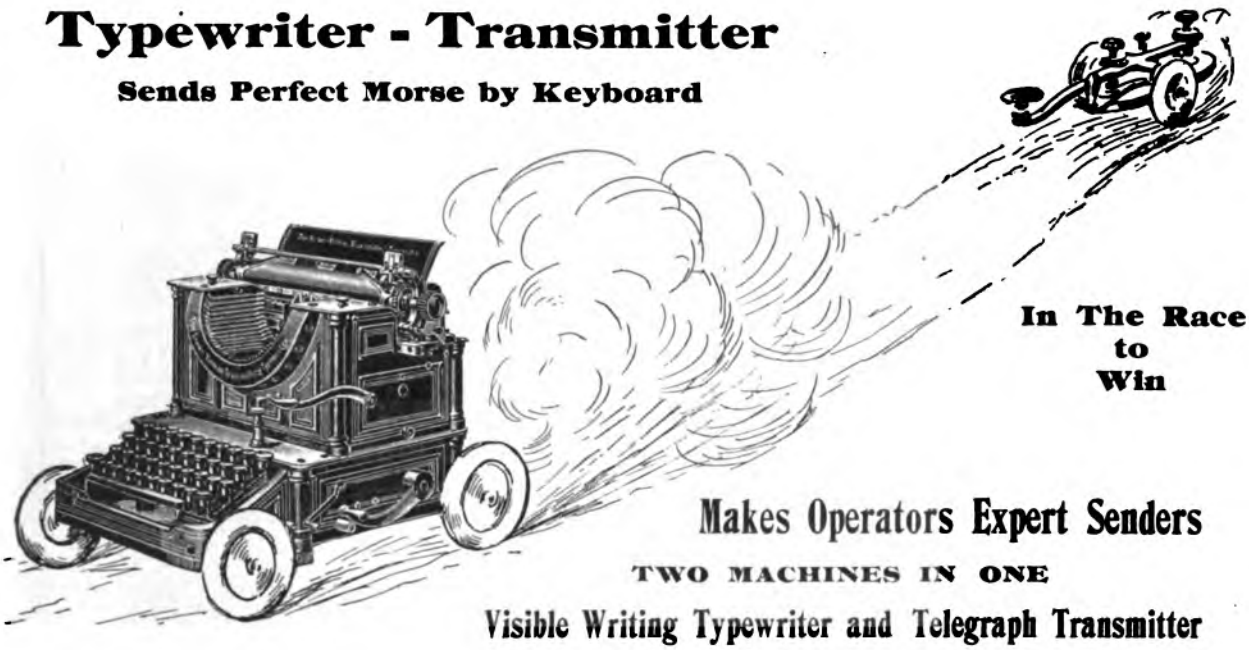
No. 7. NEW YORK, APRIL 1, 1908. Whole No. 597.

THE YETMAN

Typewriter - Transmitter

Sends Perfect Morse by Keyboard



In The Race to Win

Makes Operators Expert Senders

TWO MACHINES IN ONE

Visible Writing Typewriter and Telegraph Transmitter

The YETMAN TYPEWRITER-TRANSMITTER CO. is manufacturing this combined machine at North Adams, Mass., where it owns outright a four-story factory building with as complete an equipment for typewriter manufacture as there is in any part of the world.

The manufacturing end of the business is in charge of Chas. E. Yetman, the inventor of this machine. Mr. Yetman is Vice-President and General Manager of this company. He will devote his whole time to the factory end of the business. His assistants are the ablest men to be found in the typewriter field.

The Yetman Typewriter-Transmitter

Especially designed for Telegraph Operators so as to avoid the severe nervous and physical strain which hand-senders are up against.

You can send perfect Morse with the Yetman
You can do more work with less effort
You can be an expert sender
You can regain your lost grip

***Machines* absolutely guaranteed are being manufactured daily. There is money in the Yetman Typewriter-Transmitter for you. Write us and we will tell you why.**

Yetman Typewriter-Transmitter Co.

Box 25, North Adams, Mass.

TELEGRAPH AGE

No. 7. NEW YORK, APRIL 1, 1908. Twenty-fifth Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

A Practical Remedy for Neutralizing the Effect of Induction in Telegraph Apparatus.

BY WILLIS H. JONES.

The most potent factor mitigating against the proper operation of telegraph apparatus to-day is undoubtedly that due to induction arising from the interaction of high electromotive forces and currents between circuits of the parallel wires of electric railways and those of telegraph systems constructed along a common roadway.

Notwithstanding the great alarm created by this well recognized enemy practically nothing has been done to check its advances; or rather, nothing of a very practical nature has so far been devised to oppose or diminish its power to harm. While there has been much written and said in explanation of how induction is created and as to the manner in which it in turn creates the electrical disturbances in telegraph apparatus, no one seems to come forward with an entirely successful remedy.

With a view of ascertaining just what has been done in this direction the writer made numerous inquiries for a possible solution only to learn that others, with one or two exceptions, were equally uninformed yet fully as anxious as the writer for enlightenment.

The following method, however, is now in practical operation on the Erie Railroad between Rochester and Mt. Morris, N. Y., a distance of forty miles, and is the invention of E. W. Applegate, formerly of the quadruplex department of the Western Union Telegraph Company, New York City, and for which method he has filed papers for a patent.

That the field of his operation is most unfavorable for good results may readily be appreciated by the fact that the inductive influence he seeks to overcome arises from eleven miles of the circuits extending between Avon and Mortimer, which is exposed to the influence of the 60,000 volts' three-phase alternating current generators employed by that road in electrifying their system. This high pressure is reduced by means of transformers to 11,000 volts for the use of trolleys. Mr. Applegate states further that the different phases, being greatly unbalanced most of the time owing to the irregularity of the load carried, the disturbing effects are thereby greatly enhanced. When he arrived on the scene about one year ago all telegraph circuits were metallic, single circuits being unworkable. To-day the metallic arrangement is abandoned, and all circuits are worked single. In regard to the solution of this problem Mr. Applegate states: "After I had experimented along several lines I discovered that if I placed a shunt consisting of a 400-ohm coil of wire in connection with the line, as shown in Fig. A of the accompanying diagrams, the interaction which was set up between the relay

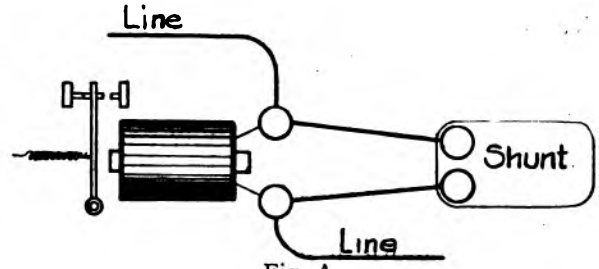


Fig. A.

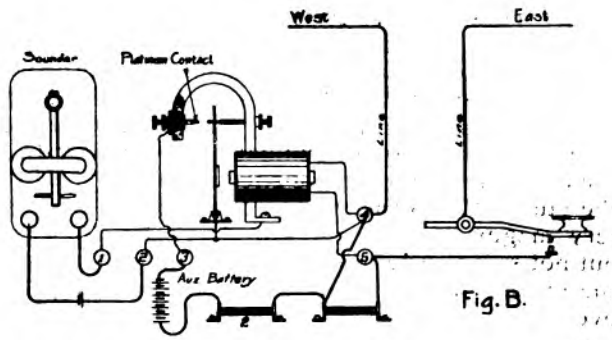


Fig. B.

coils and the shunt effectually eliminated all the chatter, the latter apparently being absorbed, so to speak, by the shunt. On the other hand, by using a non-inductive resistance shunt, such as a carbon filament lamp or simple rod of carbon, the chatter, although not quite so effectually eliminated, was nevertheless diminished to a practically negligible degree. This slight defect in the carbon shunt may be overlooked in a choice between the two types, because carbon prevents retardation. A few cells of local battery, arranged as shown in Fig. B, at once livens up the instrument and thus compensates for that slight loss the carbon produces.

"Having become fully convinced that the elimination of the static effects from the lines themselves was probably an impossible feat, I turned my sole endeavors toward pacifying the instruments. This I have accomplished by the method shown in Fig. B. By means of this arrangement the instruments are so successfully pacified that they operate as normally as though the wires were clear of extraneous influences.

"I use two carbon rod shunts for each relay connected as shown in the diagram. Shunt 1 is placed in the line between the relay and the key, the latter being outside of the shunt. The resistance of this shunt is determined by its distance from the terminal battery, the nearer the latter to the exposure the better the facility offered for carrying off the static.

"Shunt 2 is connected to the back contact point of the relay and to the main line binding post. When the armature falls back as the line opens this shunt is also connected and co-operates with shunt No. 1 in subduing the vibrations of the lever and thus rendering the armature more easily attracted by the magnet when the line circuit is again closed.

"By regulating the resistance of shunt 1 a portion of the current may be so diverted from the relay that the latter will not become prohibitively sluggish in response to the home key. Where this lagging tendency is too pronounced, however, I find that a seven-volt auxiliary battery placed in the circuit of shunt 2 quite effective in eliminating the fault. When the armature falls back this battery magnetizes the cores of the relay slightly, but not sufficiently to attract the armature against the tension of the retractile spring but enough to override the extraneous influence and at the same time hasten the action of the magnet when the line closes.

"Of course, there are details as to the adjustment of resistance and apparatus which play an important part in the arrangement, which must be looked after closely, but nothing of a nature that requires unusual skill."

Among other methods mentioned in the letters received, as having been tried and proven unsatisfactory, was that of dividing the circuit into three sections, the middle section consisting of that length of the wire which was directly exposed to the inductive influence. The idea entertained was that it would be easier and more economical to pacify the few instruments in a short circuit than it would to pacify the full length of the conductor by a like equipment of many or all stations, and that when this had been accomplished the pacified short length might be repeatered into the unexposed, and consequently unaffected divisions of the circuit each side of it. Unfortunately this arrangement did not meet the expectation. It is stated that the short or exposed length of the wire, under these conditions, immediately absorbed a greater degree of the foreign influence than when the full circuit was intact and derived the benefit of the counter effect produced by many relay coils.

Another stated that the popular notion that the neutralization of inductive effects could only be accomplished by means of properly arranged condensers placed around the relays did not prove to be true so far as his experience went.

The subject is one of interest and is certainly of great importance, and if any of our readers can suggest anything in the nature of a solution of the problem we shall be glad to publish the same.

Recent Telegraph Patents.

A patent, No. 880,971, for an insulator, has been granted to George W. Carter, of Canyonville, Ore. The insulator is transversely grooved to receive a tie wire, which clamps over the line wire and passes through an aperture in the supporting pin of the insulator.

A patent, No. 880,978, for an electrode element for storage batteries, has been issued to Thomas A. Edison, of Orange, N. J. An electrode element, comprising a perforated inclosing pocket non-deformable under normal working conditions, containing a highly compressed mass of active material and a net-work of conducting paths formed of overlapping flakes extending throughout the active mass and in contact with the pocket walls, and with which the particle of active material are deformably compressed into intimate contact, substantially as set forth.

A patent, No. 880,979, for a method of making storage-battery electrodes, has been awarded to Thomas A. Edison, of Orange, N. J. The method of making electrode elements, which consists in introducing a mixture of particles of active material and flake-like conducting material within non-deformable inclosing pockets, and in applying a pressure to such material sufficient to crush or deform the active particles and cause them to substantially follow the contour of the conducting flakes, as and for the purposes set forth.

A patent, No. 881,642, for an electric relay, has been issued to Edward Weston, of Newark, N. J. A pair of electromagnets has an armature pivoted at one end of the poles. A pair of contacts on this armature corresponds with a pair of stationary contacts supported on a bar secured to the base.

A patent, No. 882,424, for an insulator pin, has been taken out by W. Scharfhausen, of Payette, Idaho. A device for securing an insulator pin within the cross arm of a telegraph pole, comprising a groove which receives a nail and deflects the latter outwardly into the wood of the cross arm. The nail is afterward bent over to hold the pin in place.

The following patent has expired:

Patent No. 447,943, for railway-car telegraphy, held by W. S. Cook and M. C. Cook, of Omaha, Neb.

Personal.

Mr. W. Stanley Eckert, son of William H. Eckert, and a nephew of General Thomas T. Eckert, was married on March 20 to Miss May Davenport Seymour.

Mr. Al H. Babb, previous to a quarter of a century ago one of the brightest stars in the telegraphic firmament, has lately retired from the brokerage business in Peoria, Ill., with which he has been identified for the past fifteen years, and will hereafter make his residence in Chicago.

Mr. Thomas A. Edison, accompanied by his wife, has gone to Florida for a vacation of a month, in order to recuperate from his late illness occasioned by mastoiditis, for which he was obliged to undergo an operation. It is said that all Mr. Edison now requires is rest to restore him to his former health and strength.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

J. C. Barclay, assistant general manager and electrical engineer of the company, is again at his office after an extended western trip, undertaken in the interest of executive business.

Mr. W. W. Umsted, manager of the Omaha, Neb., office, accompanied by his wife, returned on March 18 from a two months' vacation spent in Italy. Both Mr. and Mrs. Umsted were much improved by their trip abroad.

Mr. T. J. Cooper, manager of the Bay City, Mich., office since 1870, was a recent executive office visitor and called during his stay in town on many old friends. Mr. Cooper sailed for Europe on March 25, and will be absent about six weeks.

The Barclay printing telegraph system is being extended to cover circuits between New York and Cincinnati, Cincinnati and Chicago and between Chicago and St. Paul and Chicago and Omaha.

RESIGNATIONS AND APPOINTMENTS.

J. C. Hurst, of Richmond, Ind., has been appointed manager of the office at New Castle, Ind., vice M. B. Adams, deceased March 3.

E. D. Edwards, formerly of Cheyenne, Wyo., has been appointed chief operator at Reno, Nev., vice J. E. Palmer, resigned.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

Edward J. Nally, vice-president and general manager, has reached the Pacific Coast in his extensive tour of inspection in the Far West. He will visit the cities of the coast before his return.

Charles C. Adams, second vice-president, is absent on a trip of inspection in the South.

Harvey D. Reynolds, superintendent at Buffalo, N. Y., was a recent visitor.

William Begg, master mechanic, Eastern Division, died at his home in Demarest, N. J., on March 22, after a brief illness. He leaves a widow and five children. Mr. Begg had been in the employ of this company for fourteen years. He was an honest, faithful, hard-working and unusually efficient employee, whose courteous and kindly disposition made him a host of friends and endeared him to all who knew him. He was a Mason and past master of his local lodge.

In addition to the large fine new office soon to be occupied by this company in Pittsburg, mentioned elsewhere in this issue, other new main offices, which will be strictly first-class in every particular, are now in course of preparation at San Francisco, Seattle, Wash., and Augusta, Ga.

Radio-Telegraphy.

William Marconi has been elected to the position of managing director of the Marconi Wireless Telegraph Company, London, England, vice H. Cuthbert Hall, resigned.

A decision of great interest to those concerned with wireless telegraphy and telephony has lately been given by the German patent office. It appears that Professor Ernst Ruhmer some years ago invented an arc interrupter for generating undamped oscillations, corresponding very closely to that used in the Poulson system and to some extent anticipating its use. The priority of Ruhmer's invention has now been recognized and a patent is to be issued for it.

Senator Hale, of Maine, who is chairman of the Senate Committee on Naval Affairs, has introduced a bill in Congress to regulate wireless telegraphy. The bill proposes to license all wireless telegraph stations or vessels equipped with wireless apparatus that do an interstate business. The issuing of the licenses is to be under the control of the Department of Commerce and Labor, and all licensed stations will be obligated to transmit or relay messages from any other licensed station, or from government wireless stations. The main feature of the proposed law, however, is the provision making it an offense for any wireless station to interfere with government messages, and giving the government power to take charge of all wireless telegraph stations in time of war. Penalties are provided for willful interference with government messages or for the unlawful employment of wireless telegraphy.

Interchange of Business Between the Telegraph Companies and the Wireless Systems.

Walter W. Massie, the inventor of the system of wireless telegraphy bearing his name, in a recent communication to the Electrical World, takes strong ground in opposition to the passage by Congress of the Hale bill, the effect of which would be to confer upon the government a monopoly control of wireless telegraphy. He also takes occasion to arraign the telegraph companies for their attitude assumed in relation to wireless telegraphy. He says:

> The telegraph and cable companies have been very persistent in publicly ignoring wireless telegraphy as a competitor, but a recent circular issued to the managers of all its offices by the Western Union Telegraph Company indicates the real attitude. In this circular it is ordered that all messages offered by the Marconi Company for transmission to points on this side, must be treated as local messages, be dated at Glace Bay, N. S., and be charged for at the local rate.

The circular of which Mr. Massie complains, reads:

> Code addresses cannot be accepted in such messages, which must be fully addressed in accordance with the rules governing the transmission of domestic messages. If the Marconi Company wishes to give any indication of other origin, they must do so in the body of the message. The message must be checked at full commercial rate, whether addressed to a newspaper, individual or firm. Messages addressed to parties on the other side routed via Marconi wireless or Glace Bay, cannot be accepted. We will, however, of course, accept messages addressed to the Marconi Company, or anyone else at Glace Bay, but no other direction or indication can appear in the address. Such messages should be checked at full commercial rates, and the tolls to Glace Bay only collected. We cannot under any circumstances accept the Marconi tolls or anything beyond Glace Bay on these messages, but must treat them solely and wholly as local messages between the point of origin and Glace Bay.

A telegraph official in commenting upon this matter had this to say:

"The criticism Mr. Massie would put upon the telegraph companies for their attitude toward the wireless companies in the matter referred to is manifestly an illogical one, and indicates an evident misconception of the situation. As a matter of fact, the policy of the companies in declining to transfer to the Marconi Company at some intermediate point messages addressed to points on the other side of the Atlantic which the telegraph companies reach by their own lines, is strictly in accord with the well-established practice of the companies on this side in dealing with each other. Those companies, for instance, having their own lines to, say, Chicago, will not accept at New York a message addressed to Chicago marked for transfer to a competing company at Philadelphia in order that the latter may complete the transmission. Their position is that they will accept business for transmission only by their own lines, when destined to places reached by those lines, and they take identically the same position with respect of the Marconi transatlantic service. It is manifestly absurd to expect the telegraph companies on this side to place their thousands of offices and the vast collecting agencies which their systems afford at the disposal of the Marconi Company for the purpose of competing with them in their own field on equal terms.

"So far as the question of abbreviated addresses is concerned, the telegraph companies on this side have never conceded the admissibility of code addresses for domestic messages, but take the ground that there is no occasion for placing upon the companies the burden and upon the service the delay of unpacking code addresses in domestic messages, so long as such addresses are not counted nor charged for. The messages delivered to or accepted from the wireless station at Glace Bay are necessarily treated as local messages destined to or originating at that point, so far as the land transmission is concerned, and they are subject to the same rules and regulations as govern all other messages of the same class.

"As a matter of illustrating the fair and even liberal attitude of the telegraph companies toward the wireless service in general it may be well to call attention to the fact that those companies accept messages freely addressed to vessels at sea, and turn the same over to the wireless stations for transmission, accounting to the wireless companies for their proportionately heavy tolls. They even refund the small amounts accruing to themselves for the land transmission in the very frequent cases where the messages fail in delivery owing to ships being out of wireless range or other defects in the wireless service, notwithstanding that the land service was fully and properly performed, and that they have no interest in the wireless tolls nor any responsibility for the wireless service."

Business Notice.

The "Telegraph Book" is an ingenious device embodying features of such convenience and practical value as to recommend its adoption in business offices. By its use three copies of a telegram are made at one writing—the first is on the regular telegram blank for sending, the second is a carbon copy on thin, tough tissue, and the third is a confirmation blank for mailing. The copy to be retained is bound securely in the book. When the book is filled the contents can be removed and the covers used repeatedly. The Telegram Book is manufactured by the Perry Book and Bindery Company, of Fond du Lac, Wis., and is advertised in the "Directory" on another page of this issue.

In the English House of Commons on February 17, the postmaster-general stated, in reply to a question, that telegraph poles were at present purchased abroad, and were of red fir. Attempts had been made from time to time to obtain supplies of suitable home-grown timber, but hitherto without success. He recently invited tenders from all parts of the country. The result was disappointing, and the only order he had been able to place at present was with a Welsh firm for a small number of larch poles.

The Railroad.

The office of H. G. Sherman, superintendent of telegraph of the Central Railroad of New Jersey, has been moved from Jersey City, N. J., to New York City.

The headquarters of W. S. Melton, superintendent of telegraph of the Queen and Crescent Route, have been removed from Chattanooga, Tenn., to Lexington, Ky.

The Illinois Central Railroad Company, it is said, has successfully introduced the exclusive use of telephones for train despatching on its line between Kankakee and Chicago.

Frank F. Fowle, formerly engineer of the American Telephone and Telegraph Company, at New York and Chicago, has established himself as a consulting electrical and telephone engineer in the Marquette Building, Chicago. Mr. Fowle has been a frequent attendant at the annual meetings of the Railway Telegraph Superintendents, and the able papers which he has read before that body have always aroused interest. A specialty of his future practice will be the planning of railway telephone systems for any form of special service, including that of simultaneous telephony and telegraphy and multiplex telephony or telegraphy.

The Coming Convention of the Railway Telegraph Superintendents.

Pursuant to the statement published in the March 16 issue, relative to the half-rate transportation which the Richelieu and Ontario Navigation Company had agreed to extend to members of the Railway Telegraph Superintendents, whose convention will meet at Montreal, Que., on June 24, 25, 26 and 27, the figures for such rates between various points on the line, will be as follows: Toronto to Montreal, $5; Kingston to Montreal, $2.75; Montreal to Quebec, $2.25 one way, return $4.25; Quebec to the Saguenay and return, $4.50. Meals and berths will be extra, dinner one dollar, breakfast and supper seventy-five cents each, berths in outside rooms one dollar per night. In order to obtain advantage of these rates members will be required to show certificates of membership when purchasing their tickets. Such certificates may be procured from P. W. Drew, secretary of the association, whose address is care of the Wisconsin Central Railway Company, now at Chicago instead of at Milwaukee, as formerly.

The programme for the social entertainment of the superintendents bids fair to be a most attractive one. As thus far arranged it includes, as already published, a local trolley ride, an excursion due to the courtesy of the Canadian Pacific Railway from Montreal to Quebec and return, and side trips by water from Montreal, including that to the celebrated Saguenay River, at half rates, as stated. Then an excursion will be made by the Grand Trunk Railway, which will convey members from Montreal to Lachine, where they will board a steamer and shoot the Lachine Rapids. Besides this a special electric train will be placed at the disposal of the association for a trip from Quebec to St. Anne de Beaupre (a celebrated shrine), and which, on its return, will stop at the beautiful Montmorency Falls.

The committee of arrangements, which has control of all matters pertaining to the entertainment of the visiting superintendents, is composed of the following: W. J. Camp, electrical engineer, Canadian Pacific Railroad's Telegraph, Montreal, chairman; W. W. Ashald, superintendent of telegraph, Grand Trunk Railway, Montreal; E. H. Millington, superintendent of telegraph, Michigan Central Railway, Detroit; G. C. Kinsman, superintendent of telegraph, Wabash Railway, Decatur, Ill.; M. Magiff, superintendent of telegraph, Central Vermont Railway, St. Albans, Vt.; S. A. D. Forristall, superintendent of telegraph, Boston and Maine Railway, Boston, and N. E. Smith, superintendent of telegraph, New York, New Haven and Hartford Railway, New Haven, Conn.

The Windsor Hotel, which has been selected as headquarters, and which is conducted on the European plan, will make the following charges: Single room without bath, $2; with bath, $2.50; two occupying a room, without bath, $3; with bath, $4. Meals a la carte. No charge will be made for exhibits if located in the rooms of the exhibitors.

The ladies' committee, which is now arranging for the reception and special entertainment of the visiting party, is made up as follows: Mrs. W. J. Camp, chairman; Mrs. James Kent, Mrs. W. W. Ashald, Mrs. M. Magiff, Mrs. J. F. Richardson, Miss Amy Jennings, Mrs. Thomas Rodger and Miss Gladys Camp.

Intending exhibitors of apparatus of whatever nature at the convention are advised that by authority of the Canadian collector of customs all such exhibits will have to be covered by regular invoices and entry passed in the usual manner, but the duty, if collected, will be refunded on the apparatus being returned to the United States. All those bringing in such apparatus should provide themselves with invoices in triplicate, and also, before leaving the United States, should make a declaration to the United States customs that the instruments are to be returned there, in order that they will not have to pay duty to the United States customs on re-entry. Duty will have to be paid on any souvenirs intended for distribution at the convention.

On the occasion of the meeting of the Superintendents of Telegraph, it is expected that the mayor of Montreal will deliver an address of welcome.

The papers to be read at the convention embrace the following:

"Dry Batteries on Telegraph Wires," by U. J. Fry, of Milwaukee; "Reduction of Telegraphing by Use of Printed Forms," by O. C. Greene, of St. Paul; "Commercial Reports," by G. C. Kinsman, of Decatur, Ill.; "Wiring of Station Build-

ings from the Contractor's Standpoint," by J. H. Jacoby; "Adverse Railroad Legislation," by E. A. Chenery, of St. Louis; "My Experiences While in Charge of Telegraph Work on the Isthmus," by C. F. Annett, of New Haven, Conn.; "Qualifying Operators for Train Despatching," by C. S. Rhoads, of Indianapolis; "Selecting Operators for Railroad Use," by L. H. Korty, of Omaha; "Moving Trains by Visible Signals," by L. B. Foley, of New York; "Block Signals," by H. C. Hope, of St. Paul; "Use of Telephones in Connection with Train Movements," by W. W. Ryder, of Chicago; "The Interstate Commerce Commission," by Charles Selden, of Baltimore; "Past, Present and Future of the Association of Railway Telegraph Superintendents," by W. F. Williams, of Portsmouth, Va.; "The Telephone," by F. F. Fowle, of Chicago.

The Hulit Selector.

A reliable and efficient means of establishing quick communication with some one particular station has been a question of great importance to the railroad and telegraph companies, who maintain a large number of small offices where the duties of the operator are varied and frequently require his attention to some other part of the station where it is impossible for him to hear a call on a sounder; consequently important business is frequently delayed on this account.

The Hulit selector call provides a quick and reliable means of notifying the operator that he is wanted at his telegraph key or telephone immediately. The selectors are operated by a series of code signals arranged in such a manner that the regular Morse business passing over the line will not effect them, thereby making a false signal impossible. Each selector has its own code number, so that if several offices are called in quick succession there is absolutely no interference, the main line is occupied just long enough for the signal to reach its respective selector which automatically cuts in a bell or any other signaling device on a local circuit, the operation of which is established by current from the local battery and at the same time leaving the main line entirely free. A vibrating bell located in a convenient place continues to ring until the operator responds and by turning a small switch contained in the selector, restores it to its normal condition at the same time answers back to its sending office notifying that the call has been received. The number of the selector, or "O. K.," can be repeated, thus making it absolutely sure that the call had been received.

The efficiency and reliability of a selector call system depends very largely upon the quick and accurate manner in which the calls are transmitted. The ordinary Morse key can be employed for this purpose, but it is slow and in a manner unreliable for the reason that it is necessary to transmit signals to the selector accurately to positively insure their operation, otherwise there would be a possibility of the selector being operated by some foreign signal which would cause considerable trouble and annoyance, making the service unreliable.

The transmitter designed for this purpose is so arranged that any number of selectors up to fifty can be operated. To facilitate rapid sending of calls the names as well as the numbers of all the offices equipped with selectors appear in plain view on the dial of the transmitter and anyone of them can be located at a glance. If, for example, communication is desired with "No. 422 Jones," the pointer is turned to this number, at the same time the hook located at the right-hand top of the transmitter is pulled down as far as it will go and released. No further attention is necessary until "answer back" signal is received. If occasion demands the calling of several offices, the calls can be transmitted in quick succession without interfering one with the other. The uniform manner in which these signals are transmitted makes the operation of the Hulit call system absolutely sure and reliable. In cases where the use of selectors are limited to a small number which would not warrant the use of a multiple transmitter, a single transmitter is furnished for each selector, the operation of which is equally as efficient as the multiple transmitter. The employment of the multiple transmitter is intended where there are ten to fifty selectors in service which would make the use of a single transmitter impractical on account of the large space they would occupy. Cuts illustrating the Hulit selector are shown in the advertising announcement of the device appearing on another page of this issue.

Foote, Pierson and Company, of 160-162 Duane street, New York, are the manufacturers of the Hulit selector.

The Yetman Typewriter-Transmitter Company.

Telegraph operators will be glad to know that the Yetman Typewriter-Transmitter Company, so long manufactured at Illion, N. Y., is now occupying its recently acquired property at North Adams, Mass., at which point it is successfully producing its well-known transmitting instrument. The present plant, which is under a fine organization, is an extensive one, thoroughly equipped in every detail to meet all requirements of manufacture, enabling the company to fill all orders promptly, whether for new instruments or the repair of old, no matter how urgent may be the demand. Mr. Charles E. Yetman, the inventor of the machine which bears his name, and who is the vice-president and general manager of the company, is devoting his energies to the manufacturing end of the business, a fact which means that the products of the concern will be even more than ever jealously guarded in their nicety and efficiency of construction.

D. L. Graham, of Canal Dover, O., writes: "It is a pleasures for me to renew my subscription for Telegraph Age. I shall appreciate your kindness if at anytime my subscription should expire, if you will notify me of the fact, as I am determined to keep abreast of the times."

Sir Wm. H. Preece on the Telegraph in America.

Sir William Henry Preece, K. C. B., F. R. S., of London, past president of the Institution of Electrical Engineers, for many years at the head of the British Telegraphs, in a lecture on "America Revisited, 1907," recently delivered before that body, said in part, in his reference to the subject of telegraphy in this country: [It should be said in explanation that Sir William stated that he had made four visits to the United States—in 1877, 1884, 1893 and 1907.]

My report of 1877 was almost exclusively on telegraphy.

The progress in telegraphy at each period of my visits is shown by the following table:

	1877.	1884.	1893.	1907.
Mileage of wire	300,000	433,726	769,201	1,321,199
Offices open ..	11,660	13,600	21,078	24,760
Messages	28,500,000	40,000,000	66,591,856	148,804,000
Capital $60,500,000	$80,000,000	$123,000,000	$140,000,000
Income	.....	.....	$24,978,440	$32,856,406

The chief result of the first visit was to establish sound reading, and to introduce quadruplex working in the post office system.

In 1884 the only novelty was Delany's "Multiplex," sending six messages simultaneously on one wire, which we imported and introduced into the post system.

The Western Union Telegraph Company had adopted the British Wheatstone system, and I saw circuits working very well from New York and from Chicago to New Orleans.

The active warlike competition of 1877 and 1884 had ceased in 1893. There was no war of rates. The only form of rivalry was good service. Very great improvement in construction was visible, and underground work became prominent. In Great Britain we had started in 1887 with underground wires, and have maintained that system on a large scale ever since. The Americans, on the contrary, were forced most unwillingly to place their wires underground by fierce legislative enactments, but they have now found that they were wrong in opposing it so strenuously. Their cities were made hideous by several rival lines of poles streaming down their principal thoroughfares. It was much better in 1893. There was no telegraphic improvement of any note. Duplex and quadruplex working were in full swing. But the typewriter for received messages had become quite fashionable. Operators provided themselves with machines, and the telegrams were delivered printed in bold Roman type—a great improvement on the usual hasty scrawl.

There is one condition of business in the United States that makes telegraphy there more profitable than in the United Kingdom. It is the existence in the message supply of what we should now call a good "message load-factor." In the United Kingdom we have but one uniform Greenwich time. People deal with their letters everywhere about the same time. There is a peak of telegrams in the morning, and another, a smaller one, in the afternoon. But in the great breadth of the United States, where there is a difference of time between New York and San Francisco of three hours, the stream of messages is virtually continuous. We may say that the load factor in the United Kingdom is 2, and in the United States 6. Their great distances and belated mails make telegraphy more necessary and instantaneous communication of less consequence. The result is that these circuits carry, on the average, three times as many messages in a day's work.

In 1907 the system of Wheatstone automatic working has been greatly improved practically by Mr. Barclay, the assistant general manager of the Western Union Telegraph Company, impressing the typewriting machine upon both the sending and the receiving ends. An ordinary typewriter typing a message actuates electrically a punching machine, which punches a paper tape in the ordinary way. This punched strip sends dots and dashes into the line in the usual Wheatstone way, so that the conductor is transmitting currents on the Wheatstone system. The receiving instrument is actuated by these currents, and reels out bold Roman type printed on the usual received copy forms, which is delivered to the public. It does this at the rate of 100 words per minute, and while I was in New York one circuit to Boston cleared off 1,097 messages in nine hours. This system has been adopted by the Western Union Telegraph Company in preference to the Buckingham or the Murray.

There were the following Barclay circuits at work at New York:

Chicago	6
Boston	2
Philadelphia	2
Buffalo	1
St. Louis	1

Pittsburg and Atlanta were about to be added.

In this system the operator does not require to know the Morse alphabet nor the manipulation of a key. She needs only to be a typewriter. The instrument does the rest. It requires little work, and it solves the much vexed question of skilled labor. It has reduced the cost of working such circuits by one-half, and it turns out perfect senders in a fraction of the time required to form a skilled Morse operator. The system is extending very fast. The Western Union company is rapidly installing it on all trunk lines, and if I ever visit America again I shall probably find it the most popular service. It is very accurate. On a Chicago circuit eight hundred messages were sent with only two repetitions.

I also inspected the Rowland system, which is on trial on the Postal telegraph system between New York and Boston. It is a quick automatic printing system dependent on the synchronous movement of the apparatus at each end. It works octoplex—four operators at each end having in succession the use of the single wire for a fraction of a second, at rapidly recurring intervals on Mayer's system. It utilizes alternating cur-

rents. I was not so much impressed with this system as with the Barclay. It is more complicated and dearer to work. It is a mistake to imagine that speed of working is a great desideratum in telegraphy. I commenced my telegraphic career in 1852 with Bain's chemical recording system, which attained a speed of 1,500 words a minute. The determining practical speed is in the handling of messages as they come in. A speaker should not speak at a rate of more than one hundred words per minute. Messages rarely pour in at greater speed than this. It is found in practice that such a speed keeps down the work on each circuit, so that it can be manipulated practically at the highest speed and the lowest cost. If the messages pour in at a greater pace than this then another circuit is necessary. Thus the unit of a telegraphic system is a message, and it is the number of messages per hour and the number of working hours per day (the message factor) that determine the number of circuits per trunk line.

The growth of telegraphy has everywhere been checked by the growth of telephony, but the expenses have not changed in the same direction. On the contrary, they have increased. The combined companies in the States have found it necessary to revise and increase their rates. The average increase adopted has been only two per cent., but many anomalies have had to be regulated, and increments of from thirty to sixty-six per cent. were made. It is remarkable how quietly this was received. It was a pure business transaction, and the Americans are essentially business people. One cause of the greater cost was, however, the reduced working capacity of the human operator, who, in my first visit, averaged twenty-five messages per hour; now the average is only seventeen. Hence the commercial value of mechanical systems worked on the automatic principle.

Our old friend, Mr. Delany, has designed an "autodot transmitter," which reduces the difficulty of learning to work the Morse key. It has two levers, one for dots worked by the thumb and one for dashes worked by the forefinger, moving horizontally with very light pressure. The number of dots made depends on the period of pressure. Thus any one with a musical ear can work a Morse key without any fatigue and with much greater accuracy. It is not so dependent on skill, and its use tends to cheapen operating charges.

He has introduced also an automatic system in which he has utilized the static charge. His receiver is the Bain chemical recorder. He has also introduced a secret system which prevents tapping or overhearing. The autodot key is used. It is very ingenious. The impulses set up by the key are sifted or disintegrated by a relay at the receiving end, which will respond only to its own tuned key.

An Appreciated Expression of Approval.

Francis W. Jones, formerly and for over twenty years the electrical engineer of the Postal Telegraph-Cable Company, New York, a telegrapher of profound knowledge in the technique of the art, and a gentleman of widely extended acquaintance both in the profession and out of it, took occasion the other day when renewing his subscription to Telegraph Age, to write concerning the paper as follows:

"As one of your earliest and continuous subscribers I desire to attest my satisfaction with the contents of Telegraph Age by requesting the renewal of my subscription for another year. Telegraph Age has provided abundant information of the very latest and best character for the guidance of both officials and operators in the most successful and profitable operation of telegraph wires and the exceedingly delicate electrical apparatus employed in testing and in the transmission of telegrams. The personal columns have also proved interesting to those in the service, in maintaining a sort of family acquaintance and history. The valuable technical instruction Telegraph Age has placed in the hands of practical telegraphers has assuredly resulted in a greatly increased efficiency of the carrying capacity of telegraph circuits, and for this I believe the telegraph companies are your debtors, as well as telegraph employes whose promotion is dependent upon the acquisition of knowledge pertinent to their profession."

The Cable.

The Republic of Chile has notified its adhesion to the International Telegraph Convention.

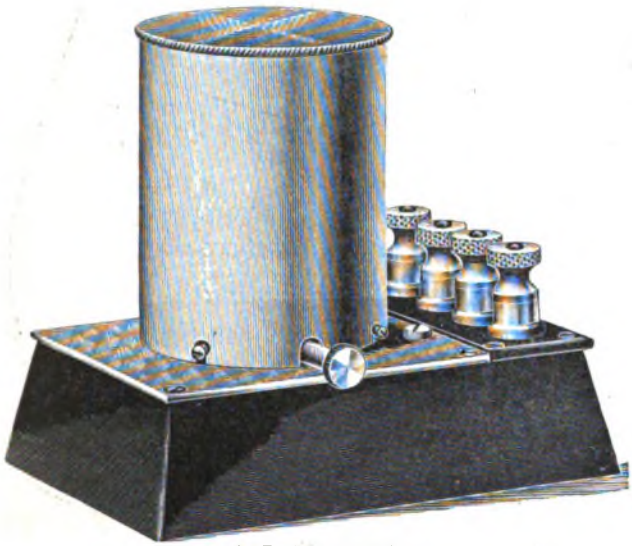
George Gray Ward, vice-president and general manager of the Commercial Cable Company, New York, accompanied by his wife, will start April 15, for Europe, going to Lisbon, Portugal, where he will attend as a delegate the International Telegraph Conference, the opening date of which is set for May 4.

The length of the cables laid by the Eastern and South African Telegraph Company between Mozambique and Durban direct is 1,186.45 nautical miles; between Mozambique and Quelimane, 423 nautical miles; between Quelimane and Beira, 260.5 nautical miles, and between Beira and Lorenzo Marqués, 584.5 nautical miles.

Cable communication is interrupted March 28, with:

Venezuela	Jan. 12, 1906
Hayti	Jan. 18, 1908
All offices closed to international traffic except Cape Hayti, Mole St. Nicholas and Port au Prince.	
Madura Island (Dutch East Indies)	Feb. 3, 1908
Sitka-Valdez cable interrupted	Mar. 21, 1908

THE HULIT SELECTOR



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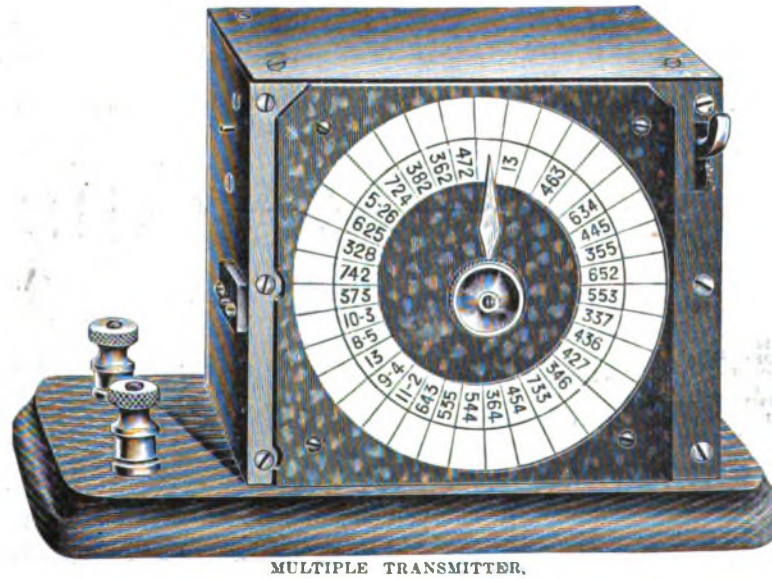

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NEW YORK, APRIL 1, 1908.

Questions Before the Railway Telegraph Superintendents.

The next meeting of the Railway Telegraph Superintendents, to be held at Montreal in June next, promises to be one of unusual interest. This is accounted for in part by the important new problems which have lately arisen in this country in connection with the operation of the nine-hour law, one of which is the substitution in larger measure than ever before of the telephone for the telegraph in train despatching. This and others considered in their various aspects as collateral thereto, are likely to furnish material for earnest discussion by the superintendents, and will doubtless prove sufficiently momentous to assure a large attendance.

Well may the introduction of these new phases in railroad operation come up for serious consideration at this time, for the far-reaching requirements of the nine-hour law are such as to work changes that may be regarded as approaching the revolutionary in character in the telegraph business so far as the handling of train orders by telegraph is concerned. The significance of this fact is doubtless fully recognized by the superintendents. The operation of this new governmental law must also as a natural sequence very materially promote the adoption of the block signal system on all railroads, and we may expect to see the signal tower usurp in part the place of the station telegraph office. Another retrenchment in telegraph usage for which the nine-hour law must also be regarded as responsible, is the fact that the railroad companies are despatching by train mail a large and growing percentage of the messages that formerly were transmitted over the wires. The discussion of these topics in all of their important bearings will serve to arouse much interest.

The Telegraph Situation.

It is a well-known fact that there are many commercial telegraphers in this country at this time who are without employment. Not only is this true, and to an extent never before realized in the history of the telegraph, but a large additional number who, while ostensibly engaged at the key, are, as a matter of fact, working on part time only; and everywhere we hear of the scaling down of wages. These facts are significant and indicate a deep-rooted cause of trouble. They reflect a condition in the telegraph service without precedent, one that cannot be attributed as being wholly incidental to the ordinary influences of business depression. In truth, it is quite out of the ordinary, and its existence may well cause questioning and reflection as to its origin and its ultimate effects.

Notwithstanding that the telephone has in late years proved to be such a formidable competitor with the telegraph, cutting sharply into its short-distance business, the telegraph companies were still handling an enormous volume of business when about a year ago this time they saw their way clear to voluntarily raise the wage schedule of their employees ten per cent. Instead of welcoming this measure as a distinctive financial gain made in recognition of the needs of the operating forces, as a manifestation of good will; an act, if not attributable perhaps to motives of benevolence, then at least to pacification, the influence of this tender, surprising as it may seem, appeared rather to arouse than soothe the antagonistic and incendiary natures latent in the dissatisfied element in telegraph employ. Although at first acknowledged and accepted, the repudiation of the pact affirmed in this wage increase soon followed, and the notable strike of last year took place. That occurrence and the dismal failure attending the same are now matters of history. But the strike in effect exerted a vicious and demoralizing influence, first to those engaged therein and then reflexly upon the telegraph itself. Its deadly venom struck deep into the individual welfare of those concerned therein. All such are now mostly out of employment. Its

poison has also been felt in the effect it has exerted on the prosperity of the telegraph companies themselves. For the union organization, although badly discredited by failure, both during the strike and since, has sought to heap opprobrium on the telegraph and bring about its injury by the attempted creation of legislative enactment hostile to its interests. Because of the mendacity of utterance on the part of leaders of the organization, coupled with adverse influences exerted by the financial panic so soon following the strike, hardships have undoubtedly beset the pathway of the telegraph companies in a manner and to an extent hitherto unknown in its history. The disastrous consequences have also been felt, unfortunately, in the loyal ranks of the personnel, expressed by a forced depletion in numbers and by cut salaries, for it has been found necessary to reduce expenses in telegraph management to a minimum. Sufferers there are, innocent victims of strike influences, harmful effects to which must be directly charged a majority of the ills that now embarrass telegraph interests.

It would be interesting to know to what extent the public is now employing the mails instead of the telegraph as formerly. Users of the telegraph were asked to believe that it was a practice of the companies to forward messages frequently by post rather than by wire. While charges of this nature were infamous, as their originators very well knew (the resort of the companies to the use of the mail and more often to the services of special messengers to deliver their messages in times of emergency, whether due to broken wires or crippled messenger service or other untoward disaster), the result is shown, unfortunately, in the fact that it is more easy to impair credit than to build it up. To restore business to its old accustomed channels when once diverted therefrom requires time and patience, the disproof of false accusation and the return of confidence.

To apply the old familiar phrase, the striking element has "killed the goose that laid the golden egg," and in consequence there is distress and lamentation in the land. They have placed telegraphic employing interests in such a position as to effectually bar their own return to their former places. In plain English, there is no work at the present time for them to do, and the times will have to improve very materially during the coming summer to give employment to one-half of the operators who may be idle. The remainder must wait their opportunities or seek employment in other walks of life.

We hear it said that the railroad companies have need of many additional operators because of the enforcement of the nine-hour law. But not many commercial operators have been taken under the wing of the railroads. The railroads themselves have felt the pinch of the hard times, and are meeting nine-hour requirements not by taking on new men, but by closing many telegraph offices and shifting their forces in such a manner as to obviate the necessity of employing additional telegraphic help.

Sympathy may be felt for the great body of unemployed telegraph operators, yet it cannot be forgotten that they brought disaster upon themselves, and in so doing are largely responsible for the dullness that has seized upon the telegraph business, and distinctly so for the distressing conditions now more or less affecting the entire personnel embraced in the telegraph fraternity. In the nature of things, especially in a country like this, so charged with recuperative power, times are bound to improve and the telegraph will get back again to normal conditions and have need of many additional operators, but the time is not yet nor is it likely to be during this year of our Lord, 1908. In the meantime unpropitious conditions affecting employers and employe alike must be endured, met and overcome as best they may.

The Supreme Court of Michigan has rendered a decision that the rules of the telegraph companies as printed on the backs of their sending blanks to the effect that the company is not to be held liable for delays in delivery or for non-delivery of any unrepeated message is not binding. This has always been held in previous decisions to be binding on senders of messages in that state. The court was evenly divided on the subject.

A bill was introduced in the New York state legislature on March 20 amending the Public Service Commission act in many respects and particularly to give the commission power over telephone and telegraph companies. The bill was approved by the governor before its introduction.

The publisher of Telegraph Age urges upon subscribers to this journal the desirability of having the paper sent to their home address rather than to their place of business. The reason is obvious. If it goes to your home it reaches you without danger of obstruction or abstraction by your office associates who are sometimes prone to borrow your copy to your discomfiture and their edification, but at your expense. This naturally is a source of irritation and of course you don't like it. If a man wants Telegraph Age he should pay for it, and the individual who is paying for his copy should be guaranteed in his rights.

As we regard our subscribers as our friends, and believe we are supplying them with a telegraph paper the like of which does not elsewhere exist, we dislike to see them disappointed, and wish to protect them in their prerogative so far as we are able. We believe that a good many disappointments of non-receipt of the paper might be averted if our suggestion of sending it in all cases to the homes of its subscribers were adopted. Changes of address will be made as often as desired.

A Chapter of Reminiscence.

BY DR. L. M. RHEEM, OF MINNEAPOLIS.

I have just finished reading Telegraph Age of March 1. And I want to say that when I read the Age, I read it as it should be read; I begin at the top of the first outside page of the cover and continue reading to the bottom of the last page of said cover, and when I get through I feel that I have read something that is worth putting some time on. But while I enjoy the exercise of the reading, I occasionally see some things that need either explanation, elucidation or further elaboration, before they can be safely offered for the consumption of the rising generation.

For instance, in this particular issue, I find in Brother James H. Gormley's delightful reminiscences, two statements that need a little treatment. Brother Gormley says: "Old men, you know, like to revert to the past, for it is an atmosphere in which they dwell more frequently than that of later day events." And, again: "If I have unconsciously made any errors of statement, attribute it to a possibly faulty memory."

Now, let those two statements alone, and the first thing you know there will be wandering around over the country, likely to go off and hurt some one, a double-barreled syllogism about like this: "Old men reminiss; old men have faulty memories; therefore, any man who reminisces is an old man and has a faulty memory."

How would that affect some of us boys, who, at the beginning of a glorious, glittering and useful career, pause long enough to tell about something that happened fifty or sixty years ago? Wouldn't it be "Back to the woods, grandpa!" for us?

I have had the honor of a place in the reminiscential family of the Age, and it made me feel good for two reasons; first, because I realized that I had broken into good company, and, second, because my reminiscences were the first and only things written by me that got themselves published. Of course, I know that I have tossed off a number of gems that should have been published had they not fallen into the hands of too hypercritical editors, for they were certainly good enough to print. Having gotten this far on the road to fame, I do not propose to run the risk of being passed outside on account of any seniliferous tendencies poorly established by an unborn syllogism, without declaring myself.

My declaration is that I am not old, and that my memory instead of deteriorating is getting stronger and better every minute. Why, do you know that when I sit down, throw on the reverse lever and gently glide back through the evergreen aisles of the (to some persons misty) past, I can recollect things that never happened, and can cite dates, persons present, and who I can prove it by. If that is not going some in a memorical way, I am not a judge.

I was thinking that just thirty-two years ago about now, I went to Denver to take the position of manager of the Atlantic and Pacific telegraph office; and I also remembered that I had promised you to send you some reminiscences of that time and place. It may be a trifle lengthy and some prolix, but I guess you have a blue pencil for censoring and a good pair of shears to chop it into suitable doses.

At just about this time of the year I had finished changing the Atlantic and Pacific Omaha office from a zoological exhibit into a sure enough telegraph office, increasing the receipts from a net nothing to from $3.31 to $7.85 per month. Mr. J. J. Dickey, my superintendent, noticing my skill in revivifying apparently hopeless propositions, asked me to go to Denver as manager to see what could be done in the way of increase there. I went.

On my way out I stopped at Cheyenne to confer with C. F. Annett, who had a sort of supervisory relation to the line between Cheyenne and Denver, and a fatherly interest in the Denver office. I will always remember the way in which Mr. Annett entertained me in Cheyenne, and showed me the town, with which he seemed to be well acquainted, and also the many helps he gave me while I stayed in that part of the country. I have never had a chance to repay him but hope to have some time.

I relieved Mr. C. F. Bouton as manager at Denver, he leaving the telegraph service for assaying in the mines in the Saguache mountains. Mr. Bouton introduced me to the patrons of the company and left the next morning for his new work.

Our office was on Holliday street in one corner of a commission house. The force I presided over there was as good a one as I ever saw in any place. As I remember it, it consisted of myself as day chief, myself as wire chief, myself as traffic chief, myself as night chief, myself as bookkeeper and cashier, and myself as manager. The operator on the Denver-Cheyenne wire was myself. I forget who worked the other wires, but since I come to think it over, I believe that was the only wire we had.

The star of the office, however, was the messenger boy, George Muirson; and I want to say right here that in all my experience with messenger boys, he was the king of them all. He was a Scotch boy about thirteen years old, but had the knowledge of a man. George's great ambition in life was to make that office pay and close up the Western Union for good; he was continually scheming to that end. In fact, everybody connected with the opposition telegraph business had to scheme to make things go and hold their job, at the time I speak of.

The business of the office was very light; the receipts scarcely more than paying expenses. In looking back to those times, and considering the policy of the company in relation to the location of offices, I often wonder why it was that we did any business at all; the office was usually located

in one corner of a tailor shop, on a shelf in the front window of a cigar store, in a commission house, or in a part of a drug store for which the ingenuity of the druggist could find no use.

Once in a while a man would make up his mind that he would "patronize the opposition, for the reason that by so doing he would assist in reducing telegraph tolls to such a surprising extent that people would soon cease writing letters and the United States mail would be a thing of the past." When he arrived at the office he usually had to either talk to the tailor awhile about getting a suit of clothes, shake the dice for the cigars with the proprietor of the store, eat a handful or two of prunes, or go into the back room to help the druggist move a stove, before his mind was in a condition for pressing his message into a ten-word bale; and on account of this diffusion of attention the man generally forgot what he came in for and went home and wrote a letter. It is almost impossible at this distance to figure the loss to the telegraph company from this source, but as near as I can figure it I am sure that it would approximate several million dollars; but, of course, it might be less.

At the time I speak of, there was a stock exchange in Denver whose dealings were confined to the few local stocks, and the stocks listed on the San Francisco stock exchange. Our company furnished the San Francisco list to this association; we got the list each day about two o'clock from San Francisco direct. The arrangement was that we were to deliver the list to the exchange where it was posted; no individual member of the exchange was to see it before such posting. Trades were then made and settled on the list of the next day. For this service we received $15 per month.

Some of the brokers had a great anxiety to see the list previous to its posting, and approached some of the members of my force, with the object of making an arrangement by which they could do so; but on account of the sterling honesty of each member of the force, they did not succeed in their plans. To this day, when I think of how that force stood up under the blandishments and accompanying refreshments handed out by those brokers, a spasm of pride passes over me, like the rustling of a winter's wind through the dead leaves on a bunch of jack oaks.

When the blandishments and refreshments came to my knowledge, they set me to thinking; the result was that I suggested to one of these importunate gentlemen, in a delicate and diplomatic way, that while I could not show him the list, such a thing as a private message daily, by which he could get either the full list or the active stocks, might be arranged. The suggestion seemed to strike him favorably, and it was arranged with Mr. Bloomer, our manager at San Francisco, to send the broker a message each day, under an assumed name. The message was to be delivered in a way that would ensure perfect secrecy, and no receipt was to be taken for it; this was somewhat at variance with the rules of the company, but in my judgment they needed the money more than they did the rules. The scheme worked fine; and as the tariff to San Francisco was $2.50 and 17, it increased the receipts.

In a short time through working this suggestion judiciously, we had several customers on this basis, and the office was certainly on Easy Street so far as receipts was concerned.

(To be continued.)

Charles Bright on the Cable Service.

In a recent communication by Charles Bright, F. R. S. E., in the London Times Engineering Supplement, that writer essays to impart information respecting cable transmission in a manner which illustrates his unfamiliarity with a proper understanding of the subject he attempts to discuss. He says:

> The fact is that the great submarine cable systems are far more efficient than telegraphy over comparatively short distances by land. Thus, though New York is some 4,000 miles from London, cablegrams are transmitted there, and an answer secured, in far less time than it usually takes to get a telegram between London and Liverpool. Transatlantic cablegrams are, indeed, transmitted direct into stockbrokers' offices at London and New York quite ordinarily within a minute; and about five minutes is, as a rule, sufficient to cover a complete buying and selling operation between the London Stock Exchange and Wall Street, New York. For this pitch of perfection we have, in the first place, to thank healthy rivalry between four competing companies.

The so-called rivalry referred to by Mr. Bright as existing between four cable companies in transmitting messages between the London Stock Exchange and that at New York, has as a matter of fact only an indirect bearing on the splendid service rendered. The quick telegraphic results he cites are reached rather because of the methods adopted of instantaneous delivery and not so much because of rival competition. This is demonstrated by the fact that on receipt of a message from the London exchange the clerk at the cable counter in the New York Stock Exchange calls the customer addressed to the desk and delivers to him personally the telegram. The information communicated can thus be immediately acted upon and the reply promptly cabled without any person concerned in the transaction leaving the building. The elimination of all unnecessary detail in the handling of the message, rendered possible by the circumstances of the case, is responsible for the exceedingly efficient prevailing cable service effecting stock exchange transactions, that appears marvelous to the lay mind and which is indeed a record of energy almost without parallel.

On the other hand, however, should a cablegram be received from London for delivery, say, at a point in the upper portion of the city, relatively the same as in the case of a message sent from London to Liverpool, referred to by Mr. Bright, the result would be different. The cable office after translating the single word standing for the addressee into, let us say, John Smith, 6000 West One Hundred and Twenty-fifth street,

New York, would forward the message to the main office of the telegraph company whence it would be dispatched to the branch office nearest to the number given, and which possibly might be located a half mile or more distant therefrom. This interval must be overcome by the more or less alert services of a messenger boy. Time has been unavoidably consumed in this endeavor to reach the party to whom the message is addressed, although expedition has been practiced. Now, let us suppose that when the cablegram finally reaches its destination the one for whom it is intended is not at his office—possibly has gone downtown, five or ten miles away, to meet a business engagement, a contingency that of course happens in Liverpool or any other large point, whether in England or elsewhere. Hours later, perhaps, a cablegram in answer is filed for transmission to the anxiously waiting party in London, who cannot understand why his message should not have received immediate reply. The telegraph and cable have done their work well, but the irate Londoner has nothing but abuse for what he calls slow service. It is a matter of regret that writers like Charles Bright, F.R.S.E., can be found who do not make these points clear to the public mind.

Representative Canadian Telegraphers.

SIDNEY B. McMICHAEL.

Sidney B. McMichael, of Toronto, who holds the position of general assistant of the Great

SIDNEY B. McMICHAEL.
General Assistant Great North Western Telegraph Company, Toronto, Ont.

North Western Telegraph Company, and superintendent of the Dominion Messenger and Signal Company, is a native of St. Louis, Mo., where he was born September 17, 1873. He is the son of Isaac McMichael, vice-president and general manager of the Great North Western Telegraph Company, who is a native Canadian. He entered the telegraph service at St. Paul, Minn., October 1, 1892, in the employ of the Western Union Telegraph Company. During 1893, '94 and '95 Mr. McMichael was engaged in other business, but in 1896 returned to the telegraph at St. Paul, and for nearly three years served as cashier of the Western Union interests at that point. After another brief absence from the telegraph service, he was appointed in 1900 general superintendent of the several American district telegraph companies, covering the districts embraced within the states of Minnesota, Wisconsin, the Dakotas, Montana and Washington, subsequently, in 1902, receiving the appointment of assistant superintendent of the American District Telegraph Company of New Jersey, of the eighth district, Western division. After serving during 1904 and 1905 as secretary and sales manager of the American Locomotive Equipment Company, at Chicago, he accepted in 1906 the position he now fills.

JOSEPH BEAUCHAMP.

Joseph Beauchamp, inspector of the Quebec division of the Great North Western Telegraph Company, at Quebec, Dominion of Canada, is a representative type of the best element in the

JOSEPH BEAUCHAMP.
Inspector, Great North Western Telegraph Company, Quebec, Que.

Canadian telegraph field. He was born at Montreal, Que., April 7, 1873, and began his telegraphic career August 14, 1887, when but a lad, beginning as a check boy in his native city in the employ of his present company. In fact, in this particular service he has always remained. Readily acquiring the ability to telegraph, he became an operator, thus serving until 1890, when he was transferred to the Campbellton, N. B., office. After two years he was promoted to the managership, a position he retained until 1905, filling the post with much ability, when, on November 1 of that year, he received appointment to the position he now holds.

Mr. C. L. Lewis, superintendent, Postal Telegraph-Cable Company, Los Angeles, Cal., in a recent letter writes in a pleasant vein and remarks: "It gives me pleasure to renew my subscription and to wish Telegraph Age renewed success."

The New Patent Law in Great Britain.

Special Agent Roland R. Dennis, writing from London, tells of the effect of the new law in the United Kingdom concerning patents, under which the article patented must be produced in that country or the patent will be canceled. American and German firms are already arranging to establish factories in Great Britain in order to hold their patents. The United States law does not have such a requirement, though it is a peculiarity of the laws of Germany, France and other European nations. Mr. Dennis says:

At the 1907 meeting of the National Association of Agricultural Implement and Vehicle Manufacturers the chairman of the committee on tariff devoted a considerable portion of his report to the subject of patents in the different countries of the world. He took up in a comprehensive manner the charges made for issuing a patent and the subsequent fees payable and the other requirements necessary to keep the patent alive. I quote from the report as published:

"With nearly every nation, aside from the United States, the burden upon the inventor is exceedingly great, particularly to foreigners; not only on account of the excessive taxation, but inability to 'work' the patents covering their inventions. Our government has no requirement other than fees amounting to $35. No taxes are called for, and no 'working' required."

On January 1, 1908, the Patent and Designs Act, 1907 (7 Edward 7, chapter 29), went into effect in Great Britain and very greatly altered the position of any foreigner applying for a patent in the United Kingdom. The fees as noted under the new act are as follows (£=$4.86):

(a) On application for provisional protection.	£1
On filing complete specification.....	3
On sealing (or granting) of the patent..	1
	5
(b) Further, before end of four years from date of patent	50
(c) Further, before end of eight years from date of patent	100

Or in lieu of the fees of £50 and £100 the following annual fees:

Year.	Amount.	Year.	Amount.
Fourth	£10	Ninth	£15
Fifth	10	Tenth	20
Sixth	10	Eleventh	20
Seventh	10	Twelfth	20
Eighth	15	Thirteenth ...	20

Making the total of fees payable during the life of the patent—fourteen years—to be £155 ($754.30).

Paragraph 27 is the one most objectionable to the foreigner and one that virtually prevents the patenting of small improvements on any foreign-made machines now being sold in the United Kingdom. I give this paragraph in full:

27. (1) At any time not less than four years after the date of a patent and not less than one year after the passing of this act, any person may apply to the controller for the revocation of the patent on the ground that the patented article or process is manufactured or carried on exclusively or mainly outside the United Kingdom.

(2) The controller shall consider the application, and if after inquiry he is satisfied that the allegations contained therein are correct, then, subject to the provisions of this section, and unless the patentee proves that the patented article or process is manufactured or carried on to an adequate extent in the United Kingdom, or gives satisfactory reasons why the article or process is not so manufactured or carried on, the controller may make an order revoking the patent either—

(a) Forthwith; or

(b) After such reasonable interval as may be specified in the order, unless in the meantime it is shown to his satisfaction that the patented article or process is manufactured or carried on within the United Kingdom to an adequate extent.

Provided, that no such order shall be made which is at variance with any treaty, convention, arrangement, or engagemnet with any foreign country or British possession.

(3) If withi nthe time limited in the order the patented article or process is not manufactured or carried on within the United Kingdom to an adequate extent, but the patentee gives satisfactory reasons why it is not so manufactured or carried on, the controller may extend the period mentioned in the previous order for such period not exceeding twelve months as may be specified in the subsequent order.

(4) Any decision of the controller under this section shall be subject to appeal to the court, and on any such appeal the law officer or such other counsel as he may appoint shall be entitled to appear and be heard.

Legal.

In the matter of the case of the Western Union Telegraph Company vs. the Gulf, Colorado and Santa Fe Railway Company, which case involves the anti-pass law of Texas, and which was argued in the United States Circuit Court for the northern district of Texas, the Hon. Edward R. Meek, judge of the court, at Dallas, Tex., sustained the petition of the complainant.

The suit was brought by the Western Union Telegraph Company against the railroad named to compel it to keep its contract, which was enacted before the anti-pass law became effective. This contract set forth that all authorized officers and all persons in the employ of the Western Union Telegraph Company, when traveling on business for the company, should be transported free of charge. The contract also stated that the said railroad company should transport and distribute free of charge all poles and other material and supplies for the construction and maintenance of offices of both the complainant and the defendant at places along and adjacent to said railroad.

United States Military Telegraph Legislation.

David Homer Bates, one of the "sacred three," so-called, cipher operators, serving in the War Department telegraph office during the Civil War, and who has been active in seeking to ameliorate the condition and determining the true legal status of the surviving members of the military telegraphers, figures in the following correspondence, which explains itself:

658 Broadway, New York,
March 2, 1908.

HON. SERENO E. PAYNE,
HON. JOHN DALZELL,
House of Representatives,
Washington, D. C.

Dear Sirs:

LORIMER BILL 175 NOW IN HANDS OF INVALID PENSIONS COMMITTEE.

The above bill is supplementary to the act approved by Grover Cleveland January 26, 1897, which by its terms, placed the members of the United States Military Telegraph Corps during the Civil War in the ranks of the United States Army.

During the war, because of the confidential character of their service, they were in effect soldiers, but were not enlisted or commissioned because President Lincoln and Secretary Stanton decided for the good of the service not to have them mustered in on the ground that if this had been done, they would necessarily be subject to the orders of their superior officers, and it might occur that thus through inadvertence or otherwise the army telegraph cipher codes and cipher dispatches might be divulged and important army movements interfered with.

The writer entered the military telegraph service April 27, 1861, serving during the entire war and until August, 1866, as cipher operator and manager of the War Department telegraph office and feels competent to speak in behalf of less than two hundred survivors out of one thousand five hundred, at the maximum, who rendered what we claim was most important and valuable service to the government during its crisis. Many of our number are past three score and ten, some are paralyzed or otherwise disqualified for earning a living.

We therefore appeal to our Representatives in Congress to do us the simple but tardy justice of favoring the Lorimer bill which in effect would give a small pension to less than two hundred survivors.

Very truly yours,
D. H. BATES,
Secy. Ex. Com. U. S. M. T. Corps.

COMMITTEE OF WAYS AND MEANS,
House of Representatives,
Washington, D. C., March 16, 1908.

MR. DAVID H. BATES,
658 Broadway, New York City.

Dear Sir:

Yours of the 12th inst. was handed to me by Mr. Olcott. I am not in favor of extending pension to those who were not enrolled in the army. I am opposed to any civil pension bill of any kind. If we gave pensions to telegraphers in the army it would not be long before we should have another deserving class of civilians asking for pensions, and we should find ourselves confronted by precedent for numerous classes of private pensions.

Yours very truly,
(Signed) SERENO E. PAYNE,

To the communication of Congressman Payne, Mr. Bates returned the following answer on March 21:

HON. SERENO E. PAYNE,
House of Representatives,
Washington, D. C.

Dear Sir:

Your reply of March 16 to my letter re above bill received. You say you are opposed to a "Civil pension bill of any kind" for the reason that "if pensions were given to army telegraphers (during the Civil War) it would not be long before we should have another deserving class of civilians asking for pensions and we should find ourselves confronted by precedent for numerous classes of private pensions." The logic of which is that you are afraid to do justice to a small and specially deserving class (less than two hundred) for fear that another "deserving class" may apply and that Congress would not have the courage to withstand the pressure. But the question arises, Were military telegraphers in the civil service? We claim that we are already in the United States army. The special act of January 26, 1897, places us there by direct mention. We were under the immediate control and direction of the Commander and Chief and the Secretary of War, whose orders would not allow even the commanding general in the field to interfere with our secret cipher duties.

All we ask under H. R. 175 is that, having rendered specially important and invaluable service under the same risks as were suffered by regularly enlisted soldiers, the paltry number of survivors of the United States Military Telegraph Corps shall be allowed a soldier's pension.

We assume that there is no other reason than the one you have given for your opinion expressed in your letter.

Yours with great respect,
DAVID HOMER BATES,
Secy. Ex. Com. U. S. Military Telegraph Corps.

When it is up to the politicians in any given state to assess the local property of a telegraph company, the figures arrived at are usually far and away in excess of its real value. Were these same politicians called upon to express an opinion as to the value of the telegraph plant in case the government should conclude to take over the property, how ridiculously infinitesimal would become the same figures.

Neutralizing Inductive Disturbances in Telegraph Lines.

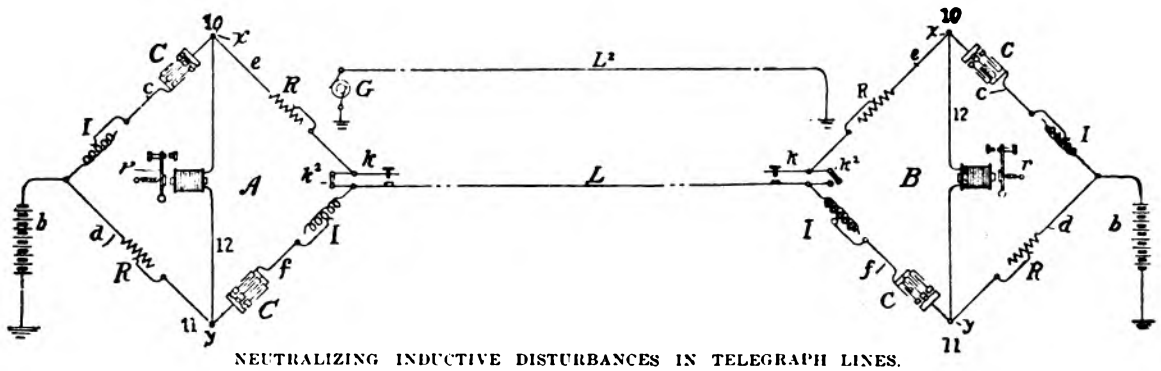
The introduction of the single-phase electric railways has caused trouble in the operation of many adjoining telegraph lines, due to inductive disturbances set up in the latter interfering with the normal operation of the relays or other receiving instruments. To overcome these effects an interesting system has been invented by Edward Blakeney, of Ossining, N. Y., and Robert E. Chetwood, Jr., of Elizabeth, N. J., and the patent on this method has been assigned to the American Telephone and Telegraph Company.

To understand the conditions it is nesessary to consider that the ordinary telegraph system is one in which the relays are operated by the presence or absence of direct current. In other words, it is organized for operation by the normal slowly recurring current impulses of standard Morse signals manually transmitted. If the line has near it a conductor through which passes an alternating current, a similar current will be induced in the telegraph line which will be superposed upon the operating current. A class of alternating current which is at the present time often encountered is that of single-phase and of comparatively low frequency, yet high relatively to Morse transmission, say, twenty-five cycles per second, which is employed for power transmission and some railway work. The electromotive forces producing such currents are usually extremely high, and of course change abruptly from their maximum value to zero, giving powerful inductve effects, yet the frequency is not so great but that the armatures of the relays can follow the alternations induced in the line. As a result the operating current assumes such an undulatory character that the signals are distorted and confused by the vibration of the armatures. To exclude the alternating current from the telegraphic receiving elements and thus prevent this disturbance and to provide a system by which signals may be effectively transmitted and received without interference or confusion are the principal objects of the invention.

It consists in a means for furnishing separate paths for and confining thereto currents of diverse characteristics. The system herein described is in the form of a Wheatstone bridge circuit, with which the receiving element is associated and which excludes alternating current from the receiving element by virtue of the establishment of a condition of equipotential at the extremities of a bridge or cross conductor in which it is placed, while the bridge is thrown out of equilibrium for operating currents and made a portion of their exclusive path by the presence of inductive devices in a portion of the branches of the balance circuit to which telegraph currents are relatively impassable.

Referring to the accompanying diagram, telegraph stations (A) and (B) are provided with sending and receiving elements (k) and (r), respectively, and between which extends the line conductor (L). This conductor is shown as grounded at its extremities to complete the main circuit, though obviously a complete metallic circuit could be substituted if desired. The circuit contains batteries (b) or other suitable sources of operating current.

Situated in such proximity to the line as to act inductively upon it is shown a conductor (L^2), constituting, for example, a portion of a railway



NEUTRALIZING INDUCTIVE DISTURBANCES IN TELEGRAPH LINES.

circuit that carries an alternating current flowing from a generator (G), which is of such periodicity that a disturbance will be produced in the telegraph line prejudicial to its operation.

To nullify the effect of these parasitic or disturbing currents and to prevent the receiving instruments (r), which are shown in the drawing as relays, from being affected thereby, the line (L) is divided at each station, there being two conductors (10) and (11) connected in parallel to form a section or extension of the main circuit. these parallel branches of the line are separated into portions (c), (d), (e) and (f) by a bridge conductor (12) connecting the points (x) and (y) in the branch conductors, and in this bridge conductor of each station is connected its relay (r).

It will be seen that each of the station circuits just described is arranged in the manner of a Wheatstone bridge, the portions (c), (d), (e), (f) of the conductors (10) and (11) furnishing the four sides, while the conductor (12) provides the cross-wire or bridge. As is well known, when the fall of potential, say, the side (c) of the balance is to that in the side (e) as the fall in the side (d) is to that in the side (f), the points (x) and (y)

will be of equal potential and therefore no current will flow through the bridge path. Therefore, to nullify the disturbing effect of the energy existing in the conductor (L^2), while still permitting telegraphic operation, it is only necessary to secure equality of potential for alternating currents, while for direct currents the bridge is unbalanced.

This result may be attained by so adjusting the impedance of each side that with reference thereto the equation $\frac{c}{d} = \frac{e}{f}$ will be satisfied, and by employing in the conductors (10) and (11) at opposite sides of the bridge reactive devices such as condensers which are impassible to direct currents while permissive to alternating currents, and including in the companion sides impedance devices allowing currents of both characteristics to pass. In each of the sides (c) and (f) of the balance circuit are shown coils (I) possessing both resistance and inductance, this being preferably adjustable, and in series with the coils (I) in diagonally opposite portions of the parallel branches are condensers (C) which are shown as being of variable capacity. In each of the arms (d) and (e) is a suitable resistance (R), also preferably adjustable.

When the impedance in the various sides is balanced in the manner previously stated, the bridge (12) will be neutral to the induced alternating currents, which will flow through both the parallel branch conductors, passing inductively through the condensers, and to ground through the battery, thus leaving the relays unaffected. But upon making and breaking the main circuit by means of one of the keys the impulses will pass through the line, and since the condensers are conductively discontinuous for, or are impassable to, direct, slow-changing currents, the circuit is unbalanced as far as these are concerned, and they flow exclusively through the sides (d) and (e) and the bridge connection, these constituting the sole conducting path through the bridge circuit, and operate the relays in the usual manner.

In balancing the circuit the frequency of the disturbing current should be considered, and, as this is liable to vary, such values of resistance, inductance and capacity should be chosen as will not greatly disturb its equilibrium if slight changes in frequency occur. This may be determined experimentally or mathematically, until such values are found that the impedance will vary but little for the expected fluctuation in the frequency. In any event, the resistance in the sides (d) and (e) should be kept as low as possible to avoid cutting down the operating currents they carry. Also, if such devices for any specfic case are not unduly large, air-core coils preferably should be used in the sides (c) and (f), as is illustrated at station (A), since their inductance is reasonably constant within a wide range of practical conditions, and with non-inductive resistance in the arms (d) and (e) the circuit would remain substantially balanced for any particular frequency, regardless of the magnitude of the induced current. It may be found, however, that to secure the necessary inductance air-core coils are too cumbersome, and in such case those having iron cores may be employed, as is shown at station (B).

There are four portions of the circuit in which each of the keys (k) may be placed to effect the transmission of signals—in the bridge (12), in the line outside the balance circuit, or in either one of the sides (d) or (e) which the operating currents traverse. If located in the first-named position, the key is shunted by two circuits of large capacity furnished by the arms (c d) and (e f), respectively, so that, although the relay of the sending operator may respond properly, that of the distant station will be sluggish. With the key in the line, if the circuit is not properly balanced, some of the alternating current may pass through the bridge, and the operating current therein becomes more or less undulatory. This being the case, the action of the relay is liable to be irregular, as the key may be closed, considering the extremes, at either the period of maximum or minimum current. The most advantageous location for the key is in one of the sides (d) or (e), since when the key is open the condenser in the other branch is charged by the line batteries, and upon closure is discharged, giving a strong current impulse, which is sufficient to overcome any lagging tendency of the line current. In connection with each of the keys is shown the usual circuit closer or switch (k^2), by which the continuity of the circuit may be preserved when the operators are not transmitting. The switch at the station (B) appears as open, or in the position for transmission.—Western Electrician.

American Institute of Electrical Engineers Nominations.

The following nominations have been made for officers of the American Institute of Electrical Engineers, which, as there is no opposition, is tantamount to their election:

Louis A. Ferguson, Chicago, president; Cummings C. Chesney, Pittsfield, Mass; Calvert Townley, New Haven, Conn.; Bancroft Gherardi, New York; vice-presidents; D. B. Rushmore, Schenectady; H. E. Clifford, Boston; W. G. Carlton, New York; C. A. Stone, Schenectady, managers; G. A. Hamilton, New York, treasurer, and Ralph W. Pope, New York, secretary.

Higher Patent Office Salaries.

Partly as a result of the recent scandal in the patent office, when one of the examiners was accused of collusion in the fraudulent granting of a patent, together with the subsequent revelations of the difficulty of keeping capable technical men in the government service because of the small pay, there will be a general increase made in the salaries paid to employees there. The total appropriation for the patent office is $1,208,010, which is an increase of $76,700.

Experiences of Linemen.

When you use a telephone or turn on an electric light or send a telegram, do you ever stop to think of the men whose hands have touched every inch of the wire that carries your voice, or your message, or the electric spark? Of the men whose labor in putting the wires in place makes possible your use of them? To be sure, you have a dim, half-formed consciousness that you are using a most wonderful device that eliminates space in Aladdin-like manner, and, perhaps, a vague, momentary feeling of satisfaction that such conveniences are at your disposal. Maybe a fleeting thought of the master mind that invented the mechanism comes to you—to be discarded, half completed, the next instant when the commonplace, everyday usage of the necessity makes an indulgence in romantic speculation as to the how and the why of it absurd.

But there is a romance in the call of the telephone, the "click-click" of the Morse and the flare of the incandescent. It is not in the instrument itself, nor in the wire, but in the lives of the men who do nothing more noteworthy than the simple stringing of the wires, the men behind the guns, so to speak; the men who walk on the housetops and risk their lives daily at the top of telegraph poles with death humming and singing along a metal core but a few inches from their faces.

An item in the papers told of the thirty-foot fall of a lineman from the top of a pole. His leg was broken and his bruises were many. Daily the telegraph news of the papers bring tales of similar fatalities in various cities. Here a man is dashed to pieces on the pavement, and the curious crowd gazes up at the top of the pole from which he fell, and mutely wonders what it must feel like to fall from that distance. There a man is electrocuted, and speculation is rife as to why he became so neglectful as to come in contact with a live wire. Another dispatch narrates the fall from a roof of a lineman so interested in the adjustment of his wires that he failed to notice the bit of ice under his foot until he suddenly felt himself sliding down the roof, grabbing, clutching, striving with every muscle in his writhing body to strike some projection and avert the sickening thud below.

The life of the lineman is fraught with danger, and death works side by side with him each day. Eternal vigilance is in his case the price of life. Careful and cautious as he may be, there is always the chance that some slight detail will be remembered only when it is too late. Many a terrible struggle for life and countless stubborn, courageous battles against impending death have been grimly fought out by the men who walk on the house tops and cling to the towering poles while the rest of the world passes by underneath unaware of the tragedy that threatens above.

"Yes, I suppose it is a dangerous business," said a foreman of a construction "gang," "but I've been in it so long—for over twenty-five years—that I think of that side of it only when some poor fellow 'gets his,' as they say. In handling my men, however, I have never for a moment been unmindful of the danger they are subject to in the twinkling of an eye. And I've never sent a man up a pole or across a roof that I myself was afraid to try.

"There's a peculiar thing about a construction 'gang,' do you know? Just let one man become nervous and panic-stricken, for ever so slight a cause, and the rest of them follow him like a flock of sheep. Occasionally you find a man whose nerve is cast-iron or whose brain is slow to realize danger. He sticks, and he is usually picked up crushed and lifeless or horribly maimed and crippled. I have not seen many accidents in my day, but those I have witnessed have been ghastly in their suddenness.

"The spur which every lineman wears on the inner side of each ankle is intended to enter the pole, in climbing, as nearly horizontal as possible. A new man is taught how to ascend a pole in this manner. An old hand sometimes becomes careless or the wood has become rotted through exposure to the elements. The lineman ascends quickly, putting all of his weight on one spur as he lifts the other leg for the next step. Bingo! His spur has gone into the wood—at an angle—and out again, and he falls. That is called 'cutting out.'

"On the other hand, there are many men in the business who can ascend to the top of a pole, clasp their arms around it, remove their spurs from the wood and drop twenty feet and more, with a speed almost equal to falling, and catch their spurs in the pole again, stopping their descent a few feet from the ground. I knew a man once who invariably descended in this manner because it saved him the tedious exertion of climbing down step by step. He got his one day, though not in performing his favorite trick.

"The great danger in work on a housetop is that the lineman accustomed to clinging to a pole feels so secure on the broad roof by comparison that he becomes extremely negligent. This roof-top work, however, is rapidly becoming a thing of the past, for the companies all over the country are sending their wires into buildings direct.

"On a number of buildings in the business section of the city you will find, in large white letters painted on the walls, the warning, 'Linemen Keep Off My Roof.' The owner places the warning there with no thought of the lineman's possible danger, however, but merely because of probable injury to his tin roof by the men walking over it. Only in rare cases is his "keep-off-the-grass' sign disregarded, for but little roof work is done by the companies.

"Without doubt, the most dangerous part of the business, from a construction man's point of view, is the erecting of poles. It used to be that sixty and seventy-foot poles were used and many a time I have held my breath until the rocking,

swaying monster was upright in its hole. Three props, called 'dead men,' are placed under the pole as soon as it has been sufficiently elevated by the piles (long poles with sharp steel spear-heads at the end) of the men. The butt of the pole gradually sinks into the hole as the elevation increases. Then is the dangerous moment. The pole must be balanced to a nicety. A sudden turn or an unexpected jar will send it thundering to the earth again and the men must be quick to jump from under it. I've seen several men caught in this manner and crushed into an unrecognizable pulp.

"But the tendency is now to use shorter poles, most of them being not over twenty-five or thirty feet in length. A derrick, attached to a wagon bed, also does away with much of the danger in lifting the pole. In fact, the good old days are passing rapidly for the construction men. The risk, you know, is somewhat attractive. Why, I can remember the time when I preferred jumping three to four feet from one roof to another to going downstairs to the street and up again to the roof of the next house."

But a few months ago a construction man in the local office of a telegraph company had a most thrilling experience on the roof of a building. The roof is a peaked one with slanting sides.

"I was working on the roof," he said, "putting in a wire for a messenger call box. The previous night's rain had frozen and the roof, in addition to being slanting, was in the literal sense of the word 'as slippery as ice.' I remember I took the precaution to wear my rubbers in order to gain a better foothold. Turning suddenly for another tool from my bag, which I had balanced on the ridge pole, I slipped—though I didn't know that was what had happened until I realized that I was flat on my back, speeding along the roof streetward, with what seemed to me to be the velocity of an express train. As long as I live I shall never forget the horror of that moment. I didn't know what I thought or what I felt. I only know that the dull, ghastly thud of my body on the pavement below rang in my ears for fractions of seconds that seemed centuries in duration.

"I grabbed, I clutched, I squirmed, I twisted, I tried to flatten myself out; but down, down, down I went. Do you know what it feels like to know you are going to die a horrible death? Pray God you never will! Flat on my back I flew to my doom. And then—it is the happiest sensation I ever had or expect to have in my life—I stopped! Dazed, sick, doubting, I finally gathered sufficient strength to look to see what had saved me. To my utter amazement I found that my heels had caught in the rain-spout gutter, which was constructed unusually high above the level of the roof. But a few inches more and I would have dashed over. I believe I lay at least five minutes in that position with my knees doubled up and my feet pressing that blessed rain-spout before I dared to move. Then my pals passed me a rope."

"Though most of the work done nowadays is in conduits underground," said another construction man, "the old system of the overhead wires was far safer for the linemen. In the air all you've got to watch out for is a fall or coming in contact with a live wire. In the present system you are standing on the ground, which, of course, makes the deadly ground circuit possible at any time. Something has gone wrong along the line. A 'trouble' man is sent out to fix it. By a mistake, surprisingly easy to make through a misunderstanding, he cuts into the wrong cable, and instead of finding a wire with no 'juice' in it he runs into several thousand volts. Often the force with which he is hurled backward breaks every bone in his body. Many of us carry marks of contact with live wires touched years ago. We usually do our work silently so that no mistakes may be made. It is worth that and every other precaution possible—for you never know when you'll 'get it.'"

There is a lighter side to the work of the linemen, however, and one which serves to mitigate the stern knowledge of their dagerous profession. Many amusing anecdotes are told of enraged tenants and landlords who refuse to allow the linemen access to their roofs to run in a wire to the next building; of women who sit for a whole day in a freshly dug hole to prevent the erection of the landscape-disfiguring pole, and of 'fool questions' asked by curious spectators and asinine suggestions as to the way in which this or that piece of work ought to be done.

One of the telegraph men rejoices greatly in a story he is fond of telling, and in which he was one of the "goats."

"Not so very long ago," he says, "I was with a gang erecting a line along a country pike. Just before noon we reached a lunatic asylum and put up several poles before we knocked off for lunch. The wide stone wall around the asylum seemed a most inviting table for our dinner pails, so we all perched along it. Within the inclosure several dozen of the inmates were at work hoeing corn. We watched them rather curiously at first, but their actions seemed perfectly rational, so we gradually lost interest. Suddenly there was the most war-whoop yell you ever heard. Every man-jack of us jumped to his feet. Across the cornfield, waving their arms and brandishing their implements and shouting like demons, came the whole pack of the insane, each one of them a most terrifying 'Man With the Hoe.' They charged upon us in platoons, with their keeper far in the rear. Did we wait? Not a bit of it. Intuitively, I suppose, we all made for the two lone telegraph poles we had just erected. There was a regular fight for 'first-up.' Spurs bit deep into the wood, and one man ascended on the next man's heels. It must surely have been a comical sight to see those two poles fairly alive with clinging, frightened men and the lunatics dancing around us and holding high carnival. And to make matters worse, they climbed into our wagon, grabbed armfuls of the glass insulators used

on the crossbars to hold the wires and played 'knock-down-three-babies-and-you-get-a-half-dozen-cigars' with us. Those insulators weigh a pound or so apiece, and those lunatics may have been crazy, but there was nothing the matter with their pitching arms. We carried bruises on our bodies for weeks afterward. Of course, the keepers finally corralled them. But we stayed up those poles until the last sportive victim of 'dementia Americana' had disappeared."

"I went out with a gang to plant a few poles in a truly rural district in southern Maryland one bright, sunny day," said another lineman, "and began the usual course of procedure on the property of an old woman. She was armed with her order from the company for $1 for the usual square foot of her land on which the pole was to be placed. We started to dig. She pulled out her tape measure and measured the incision in the land. It was about six inches over a foot. We explained to her that the dirt would be put back and only a foot of her land used for the pole. Then we made the three other jabs with the spade to complete the square foot. Whew! She was on us like a vulture. 'What were we doing?' 'She had only sold one foot and here we were digging three extra ones!' The boss tried to explain to her what a square foot meant, but she couldn't understand. 'No, siree! robbers! thieves!' She had only sold a foot. The foreman took her aside to ask her how in the name of all that's holy could he put a sixty-foot pole in a hole a linear foot in dimension and gave us the wink. When the poor old lady finished her scathing tirade we had a nice hole dug a foot square and five feet deep. We jammed the pole in double-quick, I can tell you. Then she insisted on $3 more for the feet on the surface and almost took our breath away by asking $5 more for the depth of the hole. We told here to make her complaint to the proper authorities of the company and left her hacking away at the poor pole, a foot or so in diameter, with her carving knife."

"Men who are held in readiness for breaks and leaks, etc., in the feed cables," said an electric construction man, "are called 'trouble men,' and they certainly are appropriately named. All sorts of queer and unreasonable wails come into us from subscribers. One evening last summer some lady made a complaint over the phone in that chilly, touch-me-not voice usually considered so effective in dealing with mere servants of large corporations.

"'It's outrageous!' she exclaimed, 'here I pay your exorbitant rates for light and the service is getting worse every day. I want you to send a man up right away to do something to keep these horrid, black bugs from flying around my lights! Right away, do you understand!'"—Washington Star.

Railroad Telegraphers Hear Practical Talk.

Chief Despatcher E. L. Graul, of the Philadelphia and Reading Railway, recently gave a practical talk to the telegraphers of the Reading division of that road at Reading on the nine-hour law. Among other things he said:

"The first thing I wish to impress upon your minds is that while many of you work but eight hours a day the law says nine. When you relieve each other, don't be in a rush to get away. See that the man relieved is made acquainted with what is going on so that there can be no misunderstandings.

"If a scheduled train has not passed on time, inform your relief of the fact. I want you to work in harmony with one another and check up your daily business the same as the despatchers. Another point I wish to impress upon your minds is that I desire that you keep your offices and towers in perfect order and do not depend too much upon your students, as you will be held strictly responsible for the faithful performance of the duties of your office.

"Now that your hours have been cut down I expect more from you than when you worked twelve hours. There must be no sleeping on duty. No excuse will be accepted for this. Don't permit persons to frequent your offices who have no business there. This is against the rules of the company and will not be permitted. The telegraph office is not intended for that purpose.

"Get to your work on time. You have sixteen hours to do this. I don't want to hear any complaints of this character. There is also too much unnecessary talking on the wires. Cut that out. Some of the operators are in the habit of using profanity on the wire. This must cease. I have been told that some of the older operators are in the habit of rubbing it in on the beginners. Don't do that. You were all beginners once, and it is unfair and won't be tolerated.

"Don't abbreviate in sending telegrams. Spell out your words. Abbreviating is a bad practice as all operators are not familiar with that line of work; besides, it's dangerous. When a message is handed to you relating to delays of traffic get it to the chief despatcher's office as promptly as possible. Watch all trains as they pass your respective offices and see that they have the rear end. Note whether there are any hot boxes, etc., and report such matters promptly.

"It is up to you to keep the traffic moving and the new law, as far as it relates to the railroad service, must be lived up to. The operators are in a manner responsible for many delays and this will no longer be permitted.

"There is entirely too much contention for wires on the part of some operators, especially by the younger element. Stop it. Listen and watch the adjustment of your instruments before opening your keys. Always use judgment, especially in damp weather when the wires do not work clearly. Do your duty and that is all that is expected of you."

Wireless Communications Over Sea.*

BY J. ERSKINE-MURRAY.

Although the principal subject of the present paper is electrical wireless telegraphy, it may be as well to commence with a short survey of marine communications in general, since, owing to a vessel's motion, all methods of communicating with it are necessarily "wireless." In every case some type of wave motion is used as the means of transmitting the signal or message. Sound, which is one of the commonest, and perhaps the simplest form of wave motion, has served since the first dug-out canoe of prehistoric times was launched, and will continue to be of use as long as the human voice exists. That extremely simple instrument, the speaking trumpet or megaphone, renders communication easy up to several hundred yards in moderate weather, and only fails when the sound is drowned by other noises, or when a high wind carries it upwards and backwards, and so prevents it reaching its destination. The siren, though much more powerful than the megaphone, suffers, but in a less degree from the same disadvantages, and since it is slow in action and occasionally fails and splutters at critical moments, is not of much use for anything but the simplest of signals. One great disadvantage of the whistle or foghorn as a means of indicating the presence of a vessel during thick weather is that, owing to the quality of its tone, the air seems to be filled with sound, and the ear can not determine whence it comes. A deep note is essential in order that the sound may carry a long distance, but the quality of tone of an ordinary whistle or horn is about the worst that can be used in cases where it is important to distinguish the direction from whence the sound comes. What is wanted is a note rich in the upper harmonics, like the sound of a trumpet or motor horn, and not a pure tone like an organ pipe, to which the modern siren more nearly approximates.

Submarine Signaling.—For very many years it has been known that sound travels far more easily in the sea than in the air. The sea, except just at the surface, is quiet and free from turbulence; there are no currents running at more than a very few miles per hour, and vortex motions, which are probably the greatest hindrance to the propagation of sound in air in stormy weather, are extremely rare. In addition, the actual speed of transmission of sound is much greater in water than in air, the values being about 1,100 feet a second in air, and 4,700 feet a second in water. It is only recently, however, that any considerable advantage has been taken of these most valuable properties of the sea itself. Perhaps the long delay has been on account of the difficulty of satisfactorily conveying the sound from the water to the ear of the listener. Recent experiments have, however, entirely overcome this difficulty, and it is now possible to hear in a telephone on the bridge of a ship the sound of a bell rung under the water from ten to twelve miles off. This system of submarine bell signaling has been much developed during the past few years, and it may be of interest to note that up to last July not less than 294 vessels, chiefly belonging to passenger lines on the North Atlantic, and seventy-four lightships, have been equipped with submarine bells and apparatus for the reception of submarine signals from a distance. Bells which are intended to act as fixed points by which vessels can find their course are usually made to strike a distinctive number of strokes after the manner of a flashing light.

This method of wireless sound signaling has already proved of great assistance to navigators during foggy weather, and the fact that it is possible by its means to locate the direction of the buoy or lightship to which the bell is attached, with very considerable accuracy, from a distance of several miles, gives it an advantage over most other signaling systems, which will certainly lead to its adoption in the near future in all narrow waters where fog is of frequent occurrence.

Sounding by Sound.—Some years ago the writer devised a method of sounding by means of the echo from the bottom of the sea, and more recently the matter has been taken up independently by an American inventor. The attainment of satisfactory results depends on the solution of a simple and well-known problem, viz., the measurement of the short interval of time between the moment at which the sound wave is started from the ship and the moment at which it returns as an echo from the bottom. On account of the high velocity of sound in water the time taken for the echo to return from depths less than twenty or thirty fathoms is so short that it is difficult to register, but for greater depths there is no difficulty on this account. The apparatus would therefore not displace the lead line or Lord Kelvin's sounding machine, except as a very rapid means of taking the deep-water soundings, such as would often be advantageous on approaching a coast at high speed or in foggy weather.

Signaling by Light.—Passing by the well-known methods of flag and semaphore signaling, of Colomb's flashlight code, and of rockets and arrangements of lanterns, I may mention the recent developments of photophony, or light-telephony, a system of communication invented by Alex. Graham Bell in 1879 but only in recent years brought to the stage of practical utility. Telephone messages have been transmitted by means of a beam of light from a searchlight to a distance of eight or ten miles, the sender's voice being heard with perfect clearness. The system, however, suffers from the great disadvantage common to all visible signals, whether lighthouses or more complex arrangements, that they become useless during foggy weather and in snowstorms.

* Abstracted by the Electrical Review, of New York.

It is somewhat strange that mariners should have had to depend for so long on a type of signal which is bound to fail just at the moment when its aid is most needed. The explanation is, of course, that up till recent years mechanical and electrical apparatus were too much of a mystery, and required expert handling. This is now no longer the case, and means of signaling more certain in themselves than the older methods, though demanding a small modicum of technical knowledge and manipulative skill, are rapidly being added to the time-honored methods, and will, to a certain extent, displace them in the future.

General Principles of Wireless Telegraphy.—These may be summed up shortly, as follows:

1. The energy which transmits the signal is propagated over the earth's surface as an electric wave motion.

2. This wave motion, or alternate current, may be either uniform like an ordinary lighting or power current, or it may be in the form of damped wave trains, i. e., in short series of waves following one another at comparatively long intervals; each series or train commencing strongly and dying out after comparatively few waves. In the first case a high frequency alternate-current generator, or a vibrating electric arc may be used; in the latter, the intermittent spark discharge of a condenser.

3. In both cases it is necessary that the frequency of the current (number of alternations per second) should be high in order that the amount of electricity set in motion at each wave, and, therefore, the actual dimensions of the apparatus, may not be too large. This will be appreciated when it is recollected that a small quantity of electricity, or any material, when moving very rapidly, may transmit a large amount of energy. (A high-speed de Laval steam turbine is a good mechanical instance of this.) A high frequency is thus advantageous from an engineering point of view, though it is not absolutely necessary.

4. The receiving apparatus must, therefore, be capable of detecting and indicating currents whose frequencies are greater than 100,000 per second. There are now scores, possibly hundreds, of ways in which this may be done. These may be classed as follows:

(a) Imperfect electrical contacts, or coherers, whose resistance is changed by the action of the received current; (b) electrolytic detectors, which indicate the received currents by an alteration in polarization; (c) thermometric detectors which indicate the current through the effects of the change of temperature it causes; (d) magnetic detectors in which the magnetic state of a piece of magnetized iron is altered by the current; (e) electromagnetic detectors on the current balance, or electro-dynamometer principle; (f) valves or rectifiers, which, owing to their property of permitting current to pass more easily in one direction than the other, produce a more or less unidirectional and, therefore, measurable current directly from the alternating current received; (g) a miscellaneous class whose methods of action have not yet been explained.

The best known forms of coherer are (1) the Marconi, consisting of a glass tube of about five millimeters bore in which are two silver plugs about 0.5 millmeter apart, between which a small quantity of very fine nickel filings are placed. The gap is usually V-shaped to admit of regulation by merely turning the tube, as the filings only occupy about one-third of the space and are, therefore, more or less crowded together according as the wide or narrow end of the V is uppermost (2) The Lodge-Muirhead, which consists of a razor-edged steel wheel about the diameter of a threepenny bit, whose edge dips into mercury covered with oil, and which is kept revolving by clockwork. The Marconi coherer, which is a modified form of Branly tube, and is also used by the Telefunken company, requires to be decohered by tapping or shaking it after it has recorded a signal, as it would otherwise remain cohered. This, though apparently a disadvantage, is in reality the essence of its success, for it is owing to this that it was first possible to maintain the effect of the passage of the high-frequency current long enough to obtain from it a permanent record of the Morse tape by means of ordinary telegraph instruments. The Lodge-Muirhead coherer is decohered after a small fraction of a second by the movement of the wheel.

The other detectors most in use are Marconi's magnetic detector and the electrolytic receiver, or barretter, invented by Fessenden. Magnetic detectors are based on the fact that a high-frequency current, even if of very short duration, may produce considerable changes in the magnetism of a fine magnetized iron wire. In Marconi's form an endless band of fine iron wire is kept traveling round two pulleys. Surrounding one of the straight pieces between the pulleys is a small glass tube on which are wound two coils of fine insulated wire. One of these is connected to the aerial and earth wires, and the other to a telephone receiver. Two permanent magnets are placed so that their lines of force include part of the traveling iron band in their circuit. The motion of the band draws the lines to one side through the retentiveness of the iron for magnetism. The high-frequency current in the aerial wire, on passing through the small coil round the iron band, suddenly demagnetizes it, or rather releases the lines of force. These spring back into a position at right angles to the band, and in so doing cut the coil connected to the telephone, induce a current in it, and thus produce an audible click in the instrument. The motion of the band soon draws the lines aside again and renders the apparatus ready to indicate a new signal. The Morse "dash" is, of course, represented, as in all systems of wireless telegraphy, by a close succession of dots.

The electrolytic receiver, or barretter, depends

on the fact that if a constant voltage be applied between electrodes dipping into an electrolyte, one of which is of very small area, the current is, under certain conditions, unstable, and the sudden superposition of a high-frequency current causes a sudden and considerable increase in the direct current. The action is not yet properly understood, though many theories have been stated. A telephone is generally used in connection with this detector, which is one of the most sensitive of all.

It is noticeable that in this list of detectors of high-frequency currents there are very few, if any, which give directly an audible or visible indication of the signal. In practically every case it is thus necessary to have some auxiliary instrument to indicate to the operator that the detector has reacted. In some cases a telephone, syphon recorder, or Morse inker, may be used at will, in others the telephone is the only auxiliary suitable, and it is, therefore, not possible to obtain a permanent record of a message.

5. The waves are propagated outward from the transmitting station, either equally in all directions, or with a maximum in one direction according as the aerial wire is vertical or inclined. In the latter case the strongest transmission is in the direction of the lower end of the wire. This method is used at Clifden and Glace Bay, Marconi's transatlantic stations, and at Knockroe, the Poulsen transatlantic station now building.

The lines of electric force are in general attached to the ground and follow it, as they do a wire in ordinary linear conduction. The resistance and dielectric constant of the ground are important factors in determining the distance to which it is possible to signal with any given transmitter and receiver. In general, the dielectric constant is the more important of the two, and the chief reason why it is more easy to transmit signals over water than land is that the dielectric constant of water is eighty, while for dry sand or rock it is only about five. Thus it is possible to transmit signals very much further over water with a given power than over land. The actual ratio of the distances is now calculable where the natures of the soil and subsoil are known.

6. It is now easy to determine with considerablet accuracy, in fact within a few degrees, the direction from which a message is coming—a discovery which may in the near future become a great aid to navigation, since any two land stations within range of a ship will be able, by making simultaneous observations, to give their bearings, and thus to fix the actual position of the vessel. In these days of ever-increasing speeds it is becoming more and more essential that the shipmaster should be warned, when still a considerable distance away, of his approach to land. This has been done for some years by wireless telegraphy, but it is only recently that it has become possible to add to the warning a statement of the actual position of the ship at the time of sending.

7. The speed of transmission at moderate distances, and the reliability of a wireless connection, are now both as good as the same qualities in an ordinary land wire. A proof is given by the abolition of the post office wire from Hunstanton to Skegness, England, since wireless stations have been erected, and the fact that a speed of ninety words per minute has been attained between these stations.

8. The means of preventing interference between neighboring stations have been developed to such good effect in the last few years that it is now possible, as experience shows, to construct apparatus which will respond only to waves which do not differ by more than about four per cent. from the proper wave length for the station. An even greater sharpness in tuning has indeed been claimed by various workers, and may very probably have been obtained. A margin of four per cent. is, however, sufficient to render possible the efficient working of a very large number of stations in a comparatively small area without interference. The actual wave lengths to be used by ships and shore stations have been fixed in some countries, and in all which are parties to the International Convention, the wave lengths from 600 to 1,600 meters are reserved for naval purposes; wave lengths below 600 meters being available for short-distance stations, and those above 1,600 meters for long-range stations. The usual wave length for the short-distance stations, that is, under one hundred miles range) is about 400 meters. The German long-distance station at Nauen uses wave lengths of 2,000 meters; Poldhu (Marconi) of about 2,500 meters, and Clifden of about 4,300 meters.

A vessel fitted with a wireless apparatus is practically never out of range of a commercial wireless telegraph station as long as it is within sixty or seventy miles off any part of the coast of the British Islands. The same is true of Europe, off the eastern coast of North America, from Labrador to Florida, and for the whole Gulf of Mexico and the West Indies. There are six or seven stations at various points along the east coast of South America, and ten or a dozen stations at points on the Pacific coast of South and North America. On the route to India and the East, there are points of communication after leaving the Channel which simply bristles with stations, at Ushant, Corunna, all around the Mediterranean, including even Tripoli, Tunis and Algeria, Port Said, Port Tewfik, Sauger Island, India; Diamond Island, Burma; the Andaman Islands, the Philippines, Tsingtau, China; the Japanese coast, the Sandwich Islands, and Samoa. In addition to these stations, which are open for commercial work, there are, of course, many more which are intended for naval and lighthouse communications only, but which would be available in case of emergency to any vessel in distress.

The New Office of the Postal at Pittsburg.

About May 1 the Postal Telegraph-Cable Company will remove its main office at Pittsburg from the Carnegie Building, on Fifth Avenue, to the new Keenan Building at the corner of Liberty avenue and Seventh street. This building is a twenty-story skyscraper of the most modern type, being of steel and fire-proof construction throughout.

The new location is practically at the center of the downtown district and is reached by almost every street car line. It is equidistant from all depots and important hotels.

The new quarters of the Postal company comprise a ground floor office space on Liberty avenue of approximately 85 x 28 feet, in which are located the manager's office and cashier's office and receiving, delivery and messenger departments, a mezzanine floor over this office space, a lineman's department, terminal room, etc., in the basement, and the entire seventh floor. Upon this floor is the operating room, superintendent's offices, locker and retiring rooms for the operating forces, etc. Every detail of this new plant is of the most modern type. The plans for this office were prepared under the immediate supervision of E. J. Nally, vice-president and general manager of the Postal company; by M. M. Davis, electrical engineer, and his assistant, F. E. d'Humy, and they have been carried out under the direct supervision of these engineers.

The ground floor offices are located to the right of the main corridor of the building, directly facing the main passenger elevators. The fixtures are made of white Italian marble and the counter tops of the new carrara glass. This glass has the appearance of white marble, but unlike marble it is not affected by inkstains. The floor is laid in mosaic tile. The manager's office is located in front near the main entrance. The cashiers and receiving clerks are directly back of the manager's office. They are separated from the space reserved for customers by a long counter three feet in width. The top of this counter is entirely free from obstructions of any nature, thus enabling customers to converse readily with the cashiers or clerks. This feature is in marked contrast with previous practice in many offices, where customers have been separated from the clerks by more or less elaborate partitions or grill work. The new plan originates with Mr. Nally. At the rear of the office space the delivery, call circuit and messenger departments are located, the messengers using a doorway at the rear which opens upon an alley. Above the extreme rear of the office space there is a mezzanine floor upon which is located the bookkeeping department. The furnishings of the ground floor offices are in dark mahogany.

A stairway at the rear of the ground floor office leads directly to the basement where the line department and file rooms are located. A fireproof terminal room is also located in the basement, but is placed upon a mezzanine floor so that if the basement should accidentally be flooded the cable terminals will be uninjured. This terminal room is located near to and partly under the sidewalk and there is a manhole in the sidewalk so that an entrance can be effected in emergency from that point. This is a provision to take care of the circuits in the event of a general conflagration such as occurred at Baltimore and San Francisco. The terminal room is equipped with pin jacks mounted in porcelain blocks, and these blocks in turn are mounted upon

THE KEENAN BUILDING, PITTSBURG, IN WHICH ARE LOCATED THE MAIN OFFICES OF THE POSTAL TELEGRAPH-CABLE COMPANY.

iron frames. Any combination of conductors can therefore be made by the use of short cords and plugs. This makes it possible to make quick changes in case of interruption to underground cables.

The lead covered cables which enter the terminal room directly from a manhole just outside of the building line, are, after being connected to the jacks before referred to, carried up to the terminal frame in the operating room through a specially constructed fireproof shaft.

Three high speed elevators connect the ground floor directly with the operating room floor. The elevators and stairways are separated by a fire-

wall from the operating room, the space between this firewall and the elevators forming an entrance hallway to the operating room and superintendent's offices. The main switchboards abut this firewall in the operating room, and the terminal frames are located between the firewall and the switchboards.

The switchboards comprise four fifty-wire main line panels, one twenty-wire city line panel and one leg board of four rows of seventy-five spring jacks, the latter having capacity for one hundred and fifty duplexes. The switchboards are mounted upon slate which is in turn erected upon angle-iron. There is no inflammable material of any kind used in the construction of the boards except the cherry switchboard shelf. The frames at the rear of the switchboard have a capacity of five thousand terminals.

The switchboards are of the latest type, no cords being used below the switch itself. The spaces underneath the switch shelf are not enclosed, so that the terminal frames and connections are visible from the operating room. The work upon these frames and the switchboards is, however, such that concealment is not necessary. The appearance of the switchboard and frames wired up in this new way is a revelation to those who have been accustomed to wiring done in the old-fashioned way, in which a multitude of wiring sins were covered by polished woodwork.

All switchboards, operating and repeater tables, and special apparatus are connected to the terminal frames by cables. These cables run directly to the tables, etc., in iron conduits laid in the cement floor. The cement floor is covered with rock maple flooring laid in narrow strips. This insures comfort, and the arrangement of conduits does away with covered ducts and their tendency to warping and creaking.

The operating room furniture is of cherry throughout. There are one hundred and six sittings and ninety-six repeater sections. Provision is also made for forty-eight additional sittings and seventy-two additional repeater sections when needed. The operating room has a twelve-foot ceiling and is lighted by windows on all four sides of the building. Artificial illumination is by three-light clusters, located in the aisles, so arranged as to eliminate shadows upon the operating tables and typewriter keyboards. These clusters are controlled by pendant switches so that any cluster may be turned on or off at will. All receiving positions are equipped with extension arm resonators and sending positions with adjustable resonators. The tables are of Postal standard type fitted with typewriter lockers.

The dynamo room is located upon the same floor with the operating department. Ten motor-generators are used in this plant. They are mounted upon a heavy bench, the legs of which are embedded in the concrete flooring. The top of the bench is of slate. The machines are controlled from a slate switchboard which is mounted directly over the dynamo bench. The starting boxes and controlling rheostats and switches are all mounted upon the face of this board directly over the machines to which they connect. All wiring connections upon this board are made at the rear by heavy brass straps and the wiring to the board is carried in iron conduits fitted with condulets.

Lunch and retiring rooms are provided for the operating force of both sexes upon the operating room floor. These retiring rooms connect directly with the coat rooms. All of the coat lockers are of open iron work, providing for ventilation, etc.

A time-clerk's desk is located at the entrance to the operating room. Pneumatic tubes connect this room with the receiving and delivery departments. The motors operating these tubes are located in the basement. The tube system is of the compression type and the motors are in operation only when carriers are being transmitted.

Special lavatories handsomely fitted up, are located upon the sixth floor for the use of the operating department forces. The superintendent's offices face on Liberty avenue. These comprise an office for the clerical force and a private office for Superintendent Charles E. Bagley. All of the departments are provided with distilled iced water from the refrigerating plant of the building.

This plant in its entirety is typical of modern telegraph engineering, and of the policy of the Postal's management in providing the best facilities for the convenience of patrons and the prompt handling of their telegrams as well as for the comfort and welfare of its employes.

Obituary.

Thomas S. Young, a telegrapher, died at Wheeling, W. Va., on March 9, aged forty years.

Thomas E. Maddox, an old time operator, died at Washington, D. C., March 18, aged seventy-six years.

George H. Wilson, aged seventy years, an operator at Los Angeles, Cal., died in that city on March 13.

J. P. Meder, a telegrapher, aged sixty-one years, of Carson, Nev., died of pneumonia on March 1, at that place.

W. M. Oliver, of Philadelphia, aged sixty-five years, an old time telegrapher, died of heart failure in that city on March 1.

Morris B. Hockin, a broker operator at Providence, R. I., and well known as a telegrapher at other points in New England, was accidentally asphyxiated by gas on March 24.

Thomas M. Griffith, of Utica, N. Y., long since retired from business, died in that city on March 19, aged eighty-four years. In the early days of the telegraph he was a member of that profession.

Abraham C. Farley, sixty-four years of age, a telegraph operator in the employ of the Michigan Central Railroad in Kalamazoo, Mich., since the railroad was first built, almost forty-five years ago, died February 4.

Captain John P. Manning, aged seventy-two years, an old time telegrapher, died of paralysis at Ashtabula, O., on January 21. Mr. Manning was familiarly known as the "grand old man of Ashtabula." He had been employed as an operator and general agent by the Lake Shore Railroad at Ashtabula for more than fifty years, with the exception of the time he served in the army during the Civil War.

Phoebus H. Alexander, aged sixty years, well known in electrical and telegraph circles in New York, and elsewhere throughout the country, died on March 21. Mr. Alexander was at the head of various electric and telegraph supply houses during the greater portion of his life. He was the senior member of the firm of Alexander, Barney and Chapin, a telegraph and electric supply house, and at one time and for many years was general manager of the Sawyer-Man electric Company, a branch of the Westinghouse interests.

William H. Heiss, an old time telegrapher, and at various times prominent as an official in the telegraph service, died at Sioux Falls, S. D., on March 12, aged eighty-one years. He was born at Philadelphia, July 28, 1826. Prior to the Civil War he was superintendent of the Magnetic Telegraph Company and was identified with other telegraph interests. During the war he was superintendent at Washington of the American Telegraph Company, and was active in laying submarine cables across rivers and bays adjacent to Washington in the interest of the government. In 1862 he had charge of the laying of the submarine cable across Chesapeake Bay to Black River, at which point he made a connection with Fortress Monroe. Following the war Mr. Heiss was superintendent of the American Telegraph Company at New York. Later he was associated with parties who subsequently built the lines of the International Ocean Telegraph Company through Florida, to connect with a submarine cable to Cuba, subsequently being stationed at Lake City, Fla., as superintendent. When this system was consolidated with that of the Western Union in 1873, Mr. Heiss went West where he afterward continued to reside.

Benjamin F. Woodward, a wealthy real estate dealer and owner of Denver, Colo., and an old-time telegrapher, died in Mexico, March 22. Mr. Woodward was born at Newark, O., June 25, 1834. His service in the telegraph dates from 1850, when, at sixteen years of age, he was given the position of copyist in the office of the National Telegraph Company, made up of three independent corporations, of which the late James D. Reid was superintendent of all three. From Philadelphia Mr. Woodward went to Pittsburg, at which point later he became local manager of the Western Union Telegraph Company. During the early period of the Civil War, Mr. Woodward became identified with the United States military telegraph service, doing duty at the front in Virginia. He resigned in the spring of 1863, and in the following fall engaged in the construction of a branch line from Galesburg to Denver of the Pacific Telegraph Company. On October 10 of that year Mr. Woodward opened the Denver office. A few years later he was made division superintendent of the Western Union Telegraph Company, a position he held for a number of years. Subsequently, and for a dozen years, or more, he was superintendent of telegraph of the Denver and Rio Grande Railway. Mr. Woodward organized the United States and Mexico Telegraph Company and built the line from Denver to Santa Fe, although projected to the City of Mexico. It was afterward sold to the Western Union.

DEATH OF JOHN BURRY.

John Burry, of the New York News Bureau Association, and the electrical engineer of its auxiliary, the Stock Quotation Telegraph Company, New York, was found dead in his bed on the morning of March 12, at his home at Bachmann, Rosebank, Staten Island. He had been asphyxiated accidentally by gas.

Mr. Burry was born at Freiburg, Switzerland, October 17, 1861, and came to this country in 1880. He possessed an inventive mind, practical in its workings, and in the development of his ideas was rewarded with financial success. One of his greatest practical achievements was to render the stock ticker self-winding. To Mr. Burry's inventive skill also belong the credit of introducing the storage battery as an operating force in the ticker system. Another product of Mr. Burry's inventive ability is his page-printing telegraph, which delivers its message in page form suitable for commercial or domestic use, in place of the old ticker with its messages written upon a continuous tape.

The latest application of Mr. Burry's genius was shown in the installation of his printing telegraph system, connecting the houses of Congress with the new government office building in the City of Washington, described in our issue of March 16. Mr. Burry's systems have found very general adaptation and have been installed in most of the principle cities of the United States, and in several of the larger South American cities, notably Rio Janiero and Buenos Aires, as well as in Montreal, Canada. Most of these plants were installed under the personal direction of Mr. Burry himself.

Mr. Burry was of a highly optimistic nature, had a cheery manner and had the faculty of winning friends and what is better, of holding them. He is survived by his wife and six children.

John C. Barclay, assistant general manager and electrical engineer of the Western Union Telegraph Company, in a warmly expressed tribute to the memory of Mr. Burry, declared that he represented the very highest type of telegraphic engineering ability in the special field which he so magnificently filled.

Letters From Our Agents.

OTTAWA, GREAT NORTH WESTERN.

The staff here remains very nearly unchanged; late additions thereto include R. J. Daly, R. Martin Split and J. Taggart. At the Parliament office A. H. Hamer is the day manager, while W. Leslie is in charge at night.

An incident which provided no little amusement for the boys around the office occurred recently. One of the operators was sending press copy in which occurred the sentence: "You must answer 'yes' or 'no.'" The correspondent had inadvertently written the "no" as "know" and the sending operator wishing to be correct at any cost, refused to make the change when challenged. This caused hot words and considerable time was lost, the operator finally starting again, but unfortunately the next sentence to be sent in the report was: "Have you stopped beating your wife?" This was enough, and more, for the receiving operator. Thinking he had been insulted he named the sending operator most of the choice things an operator can think of, then refusing to copy anything further, called for the chiefs, and it took considerable time before he could be induced to believe the copy was as it had been sent.

An item which attracted quite a little interest here was contained in the letter from Dallas, Tex., in your March 1 issue, stating that Mr. McGalin was working upon a repeater which would do away with the transmitter, and could be worked without a local if desired. The reason for the interest is due to the fact that C. E. Davies, chief operator here, has had such a repeater in operation in the Ottawa office for the past six months, working as the last of four sets of repeaters in a leased wire, passing it on to Montreal as the final leg of the wire from Cincinnati. A duplicate set was also installed in Montreal for tests three months ago. So far these repeaters have given good satisfaction repeating the fastest dots without blur, due to the fact that they are "direct point break." Tests with the vibroplex failed to merge a dot.

ST. LOUIS, WESTERN UNION.

F. E. Patrick, traffic chief, Barclay department, has been appointed agent for Telegraph Age.

Superintendent George J. Frankel announces the appointment of R. J. Williams as manager at Newport, Ark., vice T. J. Copeland, assigned to duty elsewhere.

The following is a complete roster of chiefs in this office: W. E. Bellman, chief operator; H. G. Gosting, assistant chief operator, Barclay department: G. F. Stewart, F. E. Patrick, E. L. Morgan, E. W. Parmelee, Jr. Wire chiefs: A. E. Vantyne, R. L. Holden, C. L. Rayborn, L. N. Boone, E. P. Powers, E. McKnight, Miss Alma Snyder. Quadruplex chiefs: G. A. Riber, C. W. Crary, W. N. Manley, W. J. Armstrong. Division chiefs: E. L. Parmelee, Sr., M. J. Cassidy, M. J. Tulley, J. E. Dunlap, Miss Loretta Hood; traffic chief, P. A. Peterson; night chief operator, M. D. Crane; late night chief, J. Carson. Night division chiefs: Arthur Mitchell, in charge of force; E. A. Kintz, F. S. Rowe, C. Dougherty, E. H. Johnson, W. C. Petty; night repeater chief, O. R. Carson; loop chief, W. K. Kairn; late night wire chief, Charles Dubbs; timekeeper, E. S. Bowers; force clerk, Miss Nell Ruhlman; stenographer, Miss Margaret S. Coons; clerk, Miss Agnes Hickey.

The Barclay department is the busiest place in the office. Two printer wires to Chicago, one to Kansas City and two to New York, constitute the equipment.

NEW YORK, WESTERN UNION.

D. H. Christie, aged fifty-two years, died at Brooklyn, N. Y., on March 11. Mr. Christie was a member of the operating staff for the past twenty years and was well known in telegraph circles.

Theodore B. Fullon, aged sixty-two years, an old-time telegrapher, for many years in charge of one of the Phelps printers in this office, died in Brooklyn on March 14.

Frederick D. Britton, for over twenty-five years manager of several of the principal city offices of the American District Telegraph Company in New York, but of late with the Marvin Safe Company, died on March 14. For twenty years he was a non-commissioned officer of the Twenty-second Regiment Engineers, and his body was interred with military rites.

OTHER NEW YORK NEWS.

The annual meeting of the New York Telegraphers' Aid Society was held on March 25 at 195 Broadway, President W. E. Rath presiding. Business of a routine nature was transacted and the result of the election of the previous day was announced. All the officers were re-elected as follows: W. E. Rath, president; R. J. Marrin, vice-president; T. M. Brennan, treasurer; C. A. Kilfoyle, financial secretary, and W. B. Purcell, recording secretary. The following members were elected to the executive committee: Miss S. Dougherty, Miss M. E. Saunders, F. J. Sheridan, J. C. Kunkle, T. J. Smith, A. J. Gillman, W. W. Price, J. J. Reilly, D. J. Condon, E. Mesler and A. M. Lewis; auditing committee: J. H. Driscoll, F. J. Nurnberg and W. T. Rogers.

Assessment No. 476 has been levied by the Telegraphers' Mutual Benefit Association to meet the claims arising from the deaths of Thurston A. Irvin, at El Paso, Tex.; Peter N. Uken, at Kansas City, Mo.; Robin D. Weeks, at San Francisco, Cal.; John P. Manning, at Ashtabula, O.; Philip L. Parker, at Washington, D. C., and Thomas C. Haley, at Brooklyn, N. Y.

The J. H. Bunnell Company Election.

The annual meeting of J. H. Bunnell and Company, Inc., the old and well-known electrical house, manufacturers of telegraph instruments and electrical supplies, was held on March 10 at the offices of the company, 20 Park place, New York. The old board of officers was re-elected as follows: J. J. Ghegan, president and general manager; Charles E. Graham, vice-president, and Charles E. Merritt, treasurer. These gentlemen, together with Jesse H. Bunnell, constitute the board of directors.

Marconi Lectures in London.

In a lecture delivered in London, March 13, Signor Marconi told of the difficulties encountered in wireless transmission across the Atlantic. "There exist," said he, "certain periods, fortunately of short duration, when transmission is somewhat difficult. At times it is almost wholly ineffective unless an amount of energy greater than that used at normal times is employed. These periods occur in the morning and evening, when, owing to the differences of longtitude, daylight or darkness extends only part way across the Atlantic. Some times the receiving signals are weak and cease altogether. It appears to me as if illuminated space possessed for electric waves different refraction index, as compared with dark space. These waves in passing from one medium to another may be refracted and reflected in the same manner. An isolated storm area in the path of aerial signals will bring about considerable weakening. If stormy weather prevails right across the Atlantic no perceptible interference with our signals is noticed."

Book Review.

"Electrical Railroading as Applied to Steam Railways," by Sidney Alymer-Small, is a bulky volume of over nine hundred pages which has just made its appearance from the press of Frederick J. Drake and Company, Chicago. Electricity is rapidly coming into use on many lines of railway, being the motive power frequently governing operation of urban and suburban trains. Not only this, many roads are using electrically controlled block signals, and the use of automatic electric signals is rapidly increasing. While railroads employ the telegraph in train despatching, tower men and others are called upon these days to acquire a wider range of knowledge directing train movement, hence the study of applied electricity as affecting their vocation becomes a necessity to many. The style adopted in the book is that of questions and answers, and the subjects coming up for consideration cover so wide a range in their practical application as to afford a valuable encyclopedia of technical information. The book contains nearly 550 figurative illustrations, and is double indexed, one being general, the other specially considering New York Central and Pennsylvania equipments. It will be sent to any point, express charges prepaid, on receipt of price, $3.50. Address J. B. Taltavall, Telegraph Age, 253 Broadway, New York.

A. V. Marshall, aged seventy-five years, an old time telegrapher, died at North Fork, Ky., on March 1.

If you are a telegrapher, resident or non-resident, and desire to start a bank account where your money will be perfectly safe, and draw five per cent. interest, you can't do better than to call on or address the Serial Building Loan and Savings Institution, 195 Broadway, New York. Old conservative, sound, it can help you to buy a home.

Advertising will be accepted to appear in this column at the rate of three cents a word, estimating eight words to the line.

Will buy or sell, in one to ten share lots, Western Union Telegraph Company and Mackay Companies, stocks. Remittances by New York draft or express money order are requested. Address "Stock Investment," care Telegraph Age, 253 Broadway, New York.

Rubber Telegraph Key Knobs.

No operator who has to use a hard key knob continuously should fail to possess one of these flexible rubber key caps, which fits snugly over the hard rubber key knob, forming an air cushion. This renders the touch smooth and the manipulation of the key much easier. Price, fifteen cents.

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STORAGE BATTERIES.

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NOTHING ELSE LIKE IT.

Ohioan's New Method of Cleaning Clothes.

Causing Great Excitement Where Exhibited.
Unlike Anything You've Seen or Heard of.

Cleans Family Wash in 30 to 50 Minutes.

No Rubbing—No Chemicals—No Motors
No Washboard—No Wash Machine.

Over 35,000 Already Sold—Ladies Delighted

SEE HOW SIMPLE, different, easy. Put on stove—add water, then soap, then clothes—that's all. In 5 to 8 minutes clothes clean. Laundries clean clothes without rubbing. EASY WAY does the same at your home. Dirt removed automatically except to move the knob occasionally.

The EASY WAY. In one operation does the combined work of wash boiler, wash board and washing machine—less time, almost no labor—no injury to clothes.

The EASY WAY develops energy by mechanical manipulation, associated with hot water, soap suds, superheated steam, and scalding vapor, utilized as a compound force, all confined in a closed metal compartment. Special operating arrangements.

Cleans woolens, flannels, blankets or colored clothes, as well as white goods, finest laces, curtains, bed clothes. Saves time, fuel, labor, clothes, buttons, strength, looks, health and money.

No rubbing, wear, tear or injury. No soggy, bad-smelling, heavy wood—but all metal, strong, durable, sanitary, light in weight. Easily used, cleaned, handled—always ready. Child can use it—no experiment. **No motors.** Saves 52 days' drudgery yearly.

Thousands Praise It.

J. McGee, Tenn., writes:—"One young lady cleaned **days' washing** by old method in **one hour** with Easy Way—another in **45 minutes.**" Mrs. T. Bullen, Can., writes:—"I washed **bedding, heavy quilts, curtains,** etc., **without rubbing,** and in a very **short time.**" Laurette Mitchell, O., writes:—"Done **a big washing in 45 minutes—sold 3** already." A. D. Poppleton, N. Y.:—"Gives perfect satisfaction—washed bed quilts, greasy **overalls** and fine clothes."

Price only **$6.00 complete**—sent to any address. **Not sold in stores. Send no money**—only send your name and address. We're old firm; capital $100,000.00. Everything proven. Guaranteed. **Write** today for **30 day trial offer,** thousands testimonials, etc. **Circulars Free.**

FREE SAMPLE TO AGENTS!

Wanted Agents, Salesmen, Managers—men or women—at home or traveling, all or part time—showing—taking orders—appointing agents. **"Easy Way" new. Nothing like it.** World unsupplied—agents making **big money.** When operated, people stop—get excited—watch it. C. O. Garret, O., writes:—Showed 7 families, sold 6. A. B. Verett, of La. sold 8 one day. J. T. Peay, of N. C. been out 2 days, sold 12. W. R. Stephenson, Tex. ordered 244 in 60 days.

Write today for special agents plan, free sample, 1908 offer—act quick.

HARRISON MANUFACTURING CO., 560 Harrison Building, Cincinnati, O.

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Ohioan's New Method of Cleaning Clothes.

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Cleans Family Wash in 30 to 50 Minutes.

No Rubbing—No Chemicals—No Motors
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The EASY WAY develops energy by mechanical manipulation, associated with hot water, soap suds, superheated steam, and scalding vapor, utilized as a compound force, all confined in a closed metal compartment. Special operating arrangements.

Cleans woolens, flannels, blankets or colored clothes, as well as white goods, finest laces, curtains, bed clothes. Saves time, fuel, labor, clothes, buttons, strength, looks, health and money.

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No. 8. NEW YORK, APRIL 16, 1908. Whole No. 598.

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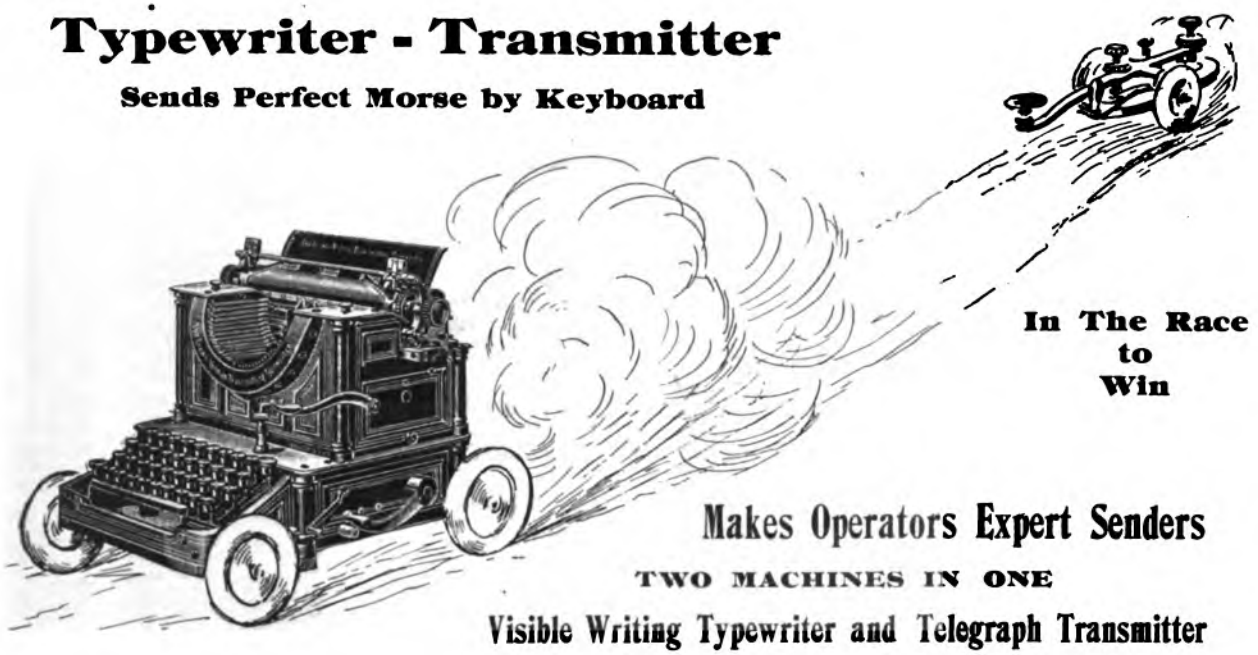
Typewriter - Transmitter

Sends Perfect Morse by Keyboard



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The manufacturing end of the business is in charge of Chas. E. Yetman, the inventor of this machine. Mr. Yetman is Vice-President and General Manager of this company. He will devote his whole time to the factory end of the business. His assistants are the ablest men to be found in the typewriter field.

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Especially designed for Telegraph Operators so as to avoid the severe nervous and physical strain which hand-senders are up against.

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Machines absolutely guaranteed are being manufactured daily. There is money in the Yetman Typewriter-Transmitter for you. Write us and we will tell you why.

Yetman Typewriter-Transmitter Co.

Box 25, North Adams, Mass.

TELEGRAPH AGE

No. 8. NEW YORK, APRIL 16, 1908. Twenty-fifth Year.

CONTENTS.

SOME POINTS ON ELECTRICITY.

Some Things that do not Occur in an Electric Circuit.

BY WILLIS H. JONES.

In the acquirement of knowledge of a given subject or the operation of apparatus students are usually somewhat retarded in reaching a correct understanding thereof owing to erroneous first impressions, which must be cleared away before actual progress begins.

Thus the common understanding of duplex operation by the unenlightened is that the two messages in opposite directions actually pass each other on the wire, and that each letter or signal comes from, and is due to the arriving current originating at the sending station. As it usually requires a great deal of study to get this idea eliminated from the mind, it is sometimes quite as important when explaining a subject to state what does not occur as it is to mention the legitimate functions of a device.

The student should understand in the beginning that two electric currents cannot possibly occupy a conductor at the same instant. An electric current represents energy exerted in a certain direction. The two polarities of current represent energy exerted in opposite directions. The actual volume of current which flows through a conductor at a given instant represents the effective energy creating it. In a wire possessing, say, one hundred ohms and one ampere of current the effective energy must be due to the pressure of one hundred volts exerted in one direction, but it might be due to the difference between oppositely directed pressures. Thus two hundred volts positive at one terminal and one hundred volts positive at the other, would give the same current volume as one hundred volts alone of either polarity unopposed. It should now be plain that although opposing electrical pressures may be simultaneously impressed, it is impossible for two currents of electricity tending to flow in opposite directions to actually use the same conveyance at the same instant.

The same law controls the magnetic lines of force which surround every conductor carrying a current of electricity. We may cause two currents of opposite polarity to traverse two coils of wire wound around a common iron core, such as the magnet core of a differentially wound relay used on multiplex circuits, or send two currents of like polarity around it in different directions because in this case we have two conductors to carry them, but so far as their capacities for creating magnetism in the relay core is concerned the two currents are now in the same position as the electromotive forces mentioned in the first case; that is to say, the two currents can now act simultaneously, but the output, represented by the amount of magnetism they create in the iron core, depends entirely upon whether the said currents aid or oppose each other in developing magnetism. In other words, whether or not the two electric currents create magnetic lines of force which flow through the iron in the same direction. If equal volumes of current oppose, no magnetism is developed; if unequal, the magnetic strength will be in proportion to the strength of current representing their differences. The student is, of course, supposed to already know that the current alone is the father of magnetism, as electromotive force is the creator of current.

From these general remarks it will be seen that although no current can flow through a wire when electromotive forces of equal pressure oppose each other at the two terminals of the circuit; or two currents of opposite polarity occupy the same conductor at the same instant; or magnetism be developed in a relay by two equal opposing currents; the equivalent of doing so is obtained by creating a difference between the respective strength of the opposing forces and thus being able to send and receive a message over one wire at the same time.

This end is attained by means of an artificial line consisting of a rheostat through which the

home current constantly flows. As one coil of the differential relay is in series with this latter circuit it follows that there can be no time when the home relay is not supplied with a current although the companion coil and main line current may be entirely shut off when the main line batteries oppose one another. The presence of the current in the artificial line is thus constantly on the alert to create magnetism in the home relay the moment the main line current fails, and as the relay coil in this artificial line is so "set," or wound, as to be continually trying to make the same signal that the distant station is making, but cannot do so when current flows through the line, the moment the main line current is shut off the home current gets a chance to magnetize the home relay and thus performs the identical service that the distant battery would have done had its current been able to get through the line.

At such times it is apparent that each station must actually be in the act of making the same signal, say a dash, the closing of their respective keys at the same instant causing the line batteries to oppose each other. Hence, under these circumstances, each home current creates a dash on the home relay and each operator hears what to him is apparently the effect of an incoming current. In all methods of multiplex operation the apparent passing of signals in opposite direction through a common conductor is accomplished either in the manner described or by allotting each transmitting station a separate but fractional period of time, during which period each have in turn the sole control of the wire.

Another erroneous impression, quite common, is that an alternating current creates no magnetism in the core of a relay. This impression is no doubt due to the fact that a single line relay or sounder connected in a circuit fed by an alternating current will show no evidence of magnetism as the lever or armature invariably stands "open."

If any one is still in doubt concerning this question let him connect a polarized relay in an alternating current circuit and adjust the local contact points closely. He will then discover that the armature lever will follow every reversal as faithfully as though actuated by the alterations in the direction of current in an ordinary duplex circuit. Its successful operation will only be limited by its mechanical inertia.

An electro-magnet of the single line relay or sounder type, however, will not show the presence of magnetism because the reversals of polarity at the ends of the iron core are so rapid that for all practical purposes we get simultaneously both positive and negative at each end. This, of course, practically demagnetizes the iron so far as its usefulness as an attractive device is concerned, and the armature consequently remains "open."

With a direct current one pole of the magnet is positive and the other negative at all times and in addition to getting a sustained magnetizing force while the current is flowing, we also get the benefit of two poles pulling together, hence the armature responds promptly.

Recent Telegraph Patents.

A patent, No. 882,347, for a composite signaling and telephone system, has been granted to Harry O. Rugh, of Sandwich, Ill. A combined telegraph and telephone system has a quadrilateral of connections at each station, the telephone receiver circuit being connected to opposite points of the bridge so formed, and the telegraph apparatus being connected in series with the line.

A patent, No. 882,649, for a cable-laying machine, has been granted to George W. Noble, of Collbran, Colo. A combination of a cable-laying plow and means for paying out the cable.

A patent, No. 882,835, for a device for attaching cross-arms to telegraph poles, has been issued to John E. McGillivray, of Walla Walla, Wash. The device consists of a body part and a shelf and lug made of sheet metal, the lug and shelf being cut one from the other, and the shelf struck up at right angles to the lug and body part.

A patent, No. 882,850, for a lineman's portable telegraph pole seat, has been awarded to Charles T. Troell, of Seguin, Texas. Clamp bars automatically secure the seat to the pole.

A patent, No. 883,062, for a strain relieving attachment for telegraph keys, has been taken out by W. H. Teachworth, of Waxahachie, Texas. An attachment for telegraph keys comprising a vibratory arm, a releasing member therefor, a contact adapted to be engaged by said arm, a shiftable key member, and an adjustable connection between the key member and said releasing member for operating the latter when the key member is shifted.

A patent, No. 883,530, for a telegraph repeater, has been obtained by Stephen D. Field, of Stockbridge, Mass. A telegraph repeater designed to overcome a characteristic defect of repeaters now in use, namely, the clipping or mutilation of the signals due to the sluggishness of the repeater receiving sounders. Provides a system by which the repeating sounders are caused to be no more strongly energized by telegraph signal dashes than by the dots, so that the armature moves off of the contact with equal promptness in any case. Provides a number of other features, among them a magnetic shunt which exerts a "kick back," so that a very slight retractile spring is sufficient. Also has a self-regulating maintaining shunt around the local contacts of the line relay which insures only a very light holding force of the relay on its armature.

The following patents have expired:

Patent No. 448,779, for telegraph, held by T. A. Edison, of Menlo Park, N. J.

Patent No. 449,174, for a telegraph transmitter, held by H. G. Robbins, of Minneapolis, Minn.

Personal.

Emilio Ortuno has been named director-general of posts and telegraphs of Spain, replacing Marquis de Valtierra, resigned.

M. Barbarat, inspector-general, has been promoted to the office of director of posts and telegraphs at Tunis, Africa, replacing M. Mazoyer, promoted to the position of secretary of posts and telegraphs at Paris.

Mr. Charles A. Tinker, of Brooklyn, formerly general superintendent of the Eastern division of the Western Union Telegraph Company, is recovering from a severe attack of pneumonia, which has caused him to pass through a prolonged and critical illness.

Mr. Donald McNicol, manager of the Postal Telegraph-Cable Company at Salt Lake City, Utah, and who is secretary of the Utah Society of Engineers, which will hold its annual banquet on the evening of April 21, will serve as the chairman of the dinner committee on that occasion.

Frank L. Catlin, of New York, son of Fred Catlin, and like his father a telegrapher of great ability, who has frequently demonstrated his power in this respect at tournaments, etc., has returned to New York from Florida, where he has spent the winter in company with his wife and young son.

Mr. Frank C. Mason, a well known old-time telegrapher, formerly and for twenty years superintendent of police telegraph in the Borough of Brooklyn, New York, who has been passing the winter in town, returned last week to his home at Glen Alex Farm, near Utica, N. Y., where he will remain until another winter will cause his return to the city.

Mr. Ernest W. Emery, of Washington, D. C., a well-known telegrapher, for the past ten years wire chief for the Southern division of The Associated Press, has been appointed day manager in that city, succeeding E. M. Hood, recently promoted to be assistant superintendent of the Southern division. Mr. Emery is a member of the Order of Elks, and was lately elected exalted ruler of Washington Lodge No. 15 of the capital city.

Mr. James E. Pettit, of Chicago, secretary of the Society of the United States Military Telegraph Corps, and who is the chief operator of the Postal Telegraph-Cable Company at that place, is seriously ill at his home, suffering from an attack of Bright's disease. Because of his illness and consequent inability to act in his official capacity, Col. A. W. B. Wilson, president of the corps, has appointed David Homer Bates, of New York, secretary pro tem in Mr. Pettit's stead.

Mr. Bernard E. Sunny, vice-president and western manager at Chicago, of the General Electric Company of Schenectady, N. Y., and formerly well-known telegrapher, has resigned his positions to take effect May 1 in order to accept a vice-presidency of the American Telephone and Telegraph Company to which he has been elected. Mr. Sunny will continue to reside in Chicago, from which point he will be in a better position to direct the affairs of the telephone company in the West. He will, however, retain his connection with the General Electric Company, although withdrawing from all active service therewith. It will be remembered that prior to 1888, and covering a period of about ten years, Mr. Sunny was superintendent of the Chicago Telephone Company, an office he filled with marked ability and was highly successful in promoting the affairs of that corporation.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Col. R. C. Clowry, president and general manager of the company; B. Brooks, general Eastern superintendent; J. Merrihew, formerly general superintendent of the Southern division; Rush Taggart, solicitor of the company, and D. H. Louderback were in Boston recently for several days, on business connected with the old litigation with the American Telephone and Telegraph Company, a matter which is now nearing final adjustment.

A readjustment of territory growing out of a new contract with the Erie Railway Company, has resulted in a few of the larger offices located at points along the eastern portion of that system of railway being transferred to exclusively Western Union districts.

A. G. Saylor, assistant general superintendent of the Eastern division, recently visited many different points within his jurisdiction, his trip being undertaken on company business.

Theodore P. Cook, general superintendent at Chicago, accompanied by M. T. Cook, his private secretary, was a visitor at this office on April 8 and 9, coming on business connected with the service.

Mr. H. L. Waterbury, manager at Saratoga Springs, N. Y., was recently elected president of the Chamber of Commerce of that place.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

Grant T. Yetman, superintendent of the Boston District Messenger Company, is in New York and will remain here for a few weeks, his business being in connection with the messenger service of this company.

Mr. R. H. Hawkins, manager of the office at Albuquerque, N. M., is absent on a two-months' vacation in Missouri, and P. A. Angus, formerly chief operator at El Paso, Tex., is temporarily filling his place as acting manager.

RESIGNATIONS AND APPOINTMENTS.

E. H. Wickelman, manager of the office at Clinton, Iowa, has been appointed manager of the Davenport, Iowa, office, vice H. E. Beeson, resigned on account of ill health.

J. D. McLelland has been appointed manager at Shreveport, La., vice I. D. Hough, resigned.

Chase Laurendine, night chief operator of the Mobile, Ala., office, has been appointed manager of the office at Gulfport, Miss.

Samuel D. Howard, chief operator at Lexington, Ky., has been appointed manager at that place, vice J. C. Williams, resigned. Mr. Raymond G. Anderson has been appointed to fill the vacancy caused by the promotion of Mr. Howard.

Radio-Telegraphy.

The Ottoman government is taking steps to develop communication by means of wireless telegraphy in the Arabian Peninsula, especially in the Provinces of Hedjaz and Yemen.

The wireless telegraph station has been completed at the Masso, Havana, Cuba. A new station has also been constructed at Santa Clara, and stations are in course of construction at Camaguey and Santiago de Cuba, that island.

The British admiralty has now eleven wireless stations on the British coast and three more will be installed during the present year. Together with war signal stations there are now one hundred and sixty-seven stations in the United Kingdom from which communications can be made to and received from war vessels. A station is now being installed at the Admiralty building in Whitehall, London, for the purpose of keeping the naval authorities in touch with naval ports and the home fleet.

An automobile equipped with a wireless telegraph apparatus was recently shown at a Brussels exhibition, and although the tall mast fitted on top of the limousine would doubtless be an unsurmountable inconvenience to touring, such an equipment is now being used in army operations and is found to be satisfactory. A number of armored automobiles thus equipped, and placed with the different divisions of a warring army, would, it is said, make the transmission of orders vastly superior to the ordinary field telegraph service.

The reports current of late to the effect that the Marconi Wireless Telegraph Company and the United Wireless Telegraph Company are considering plans of consolidation have been denied by officers of both companies. Three bills regulating the wireless service are at present pending before Congress, all of which are considered by the wireless companies to be inimical in their present form to wireless interests, and the fact that representatives from both companies have been at Washington looking after their company's affairs is suggested as the cause of the report that plans of consolidation were on foot.

An evidence of the rapid development of wireless telegraphy and of its very general installation on shipboard as a portion of modern marine equipment, is witnessed in the great number of wireless operators constantly to be met with in New York. At this port the great transatlantic liners running to all parts of the world, as well as coasting vessels, find a terminal. As many of these steamers carry one or two operators each, there are at no time probably less than from fifty to sixty such operators present in this city. As a rule, these men are among the most intelligent of the fraternity, and reflect credit to the profession of which they are members. It is to be observed that those coming from abroad frequently represent the best type of the foreign expert operator, no matter what their nativity. Among those of this class visiting New York recently was Mr. H. Poulsen, who is attached to the steamship Estoria, plying between this port and Libau, Russia, a tall young fellow typical of the stalwart race to which he belongs.

During his recent visit to German East Africa, Herr Dernberg, the German secretary of state, came to the conclusion that in consequence of its cheapness as compared with landlines through an impracticable country, wireless telegraphy comes first into consideration for such districts. After the recent performance between the Nauen station and Teneriffe, it is claimed that the bridging over of a distance of 2,480 miles could be effected with moderate funds, but the principal task is the institution of a direct connection between Germany and her colonies. During the late campaign in Southwest Africa, experience with the military stations used showed that wireless telegraphy was absolutely necessary as a means of transmitting information, and it is considered that the success eventually attained could scarcely have been accomplished without the system. At the end of 1903 six stations were in operation, the principal one being at Keetmannhoop, and the remainder in a radius of from ninety-three to one hundred and twenty-four miles. The main difficulties encountered in connection with the stations, which were originally constructed for German conditions, were in the provision of hydrogen for the balloon which supported the aerial wires, and the supply of benzine needed for driving the motor. The station itself was arranged on a tolerably heavy wagon, and it had, therefore, to overcome the greatest difficulties in penetrating the underwood, and in actions in the mountains. These obstacles have given the incentive to the perfecting of military stations in Germany, and rendered necessary the construction of specially light, portable stations, in which working materials, such as benzine, lubricating oil, etc., are no longer requisite. A station of this kind, which has just been inspected by the secretary of state, consists of a transmitting and receiving apparatus, a light metallic mast, and a bicycle under-frame for driving the generator, the total weight being four hundred pounds. The whole station can be divided into four loads for horses or mules, or into eight loads for men. It is stated that the range of the station amounts to sixty-two miles, and it can be erected in a quarter of an hour.

The Cable.

Cable communication is interrupted April 14 with:

Venezuela	Jan. 12, 1906
Hayti	Jan. 18, 1908
All offices closed to international traffic except Cape Hayti, Mole St. Nicholas and Port au Prince.	
Madura Island (Dutch East Indies)	Feb. 3, 1908
Sitka-Valdez cable interrupted	Mar. 21, 1908

The civil service estimates for England for cable subsidies for the year ending March 31, 1909, says the Electrical Review of London, have just been issued, and make provision under the heading of "Telegraph Subsidies and Pacific Cable" for the payment of £4,500 to the Eastern Telegraph Company; £35,875 to the Eastern and South African Telegraph Company; £4,000 to the Eastern Extension Company; £8,100 to the Halifax and Bermudas Cable Company, and £8,000 to the Direct West India Cable Company, while a sum of £62,500 has been ear-marked for the Pacific cable. After deducting appropriations in aid, there is a sum of £67,133 to be provided. The appropriations in aid are sums payable by various colonies, such as Canada, the Australian Commonwealth, New Zealand, Mauritius and Seychelles, towards the cost and maintenance of cables.

THE INTERNATIONAL TELEGRAPH CONFERENCE.

A concerted movement by states of Central and South America to secure at the International Telegraph Conference in Lisbon, Portugal, beginning May 4, an abrogation of the present system of coding and a return to the old rule limiting code words to bona-fide words taken from seven European languages, has caused a great stir among merchants and bankers of New York, who do much business by cable. A petition has been forwarded to Secretary Oscar S. Straus, of the Department of Commerce and Labor, urging that a representative to the coming International Telegraph Conference be appointed to protect the commercial interests of America.

The question of appointing such a special representative will receive governmental consideration, although it has been understood that the Hon. Charles Page Bryan, the United States Minister to Portugal, would be the only representative of this government present at the Conference, no one especially appearing in behalf of the Signal Service, as heretofore.

As has been previously announced, George G. Ward, vice-president and general manager of the Commercial Cable Company, New York, will be present at the Conference to represent his company's interest, and T. W. Goulding, of London, the European general manager of the Western Union Telegraph Company, will be in attendance to represent that company and its allied interests. We are advised by Camilio A. Gonzalez, director-general of the federal telegraphs of Mexico, that that country will not be represented at the Lisbon Conference.

The Municipal Electricians.

A patent, No. 883,665, for a combined police call, fire alarm and watchman's box, has been granted to J. G. Nolen, of Chicago. A manually operated signal transmitting box, capable of use as a police call box, as a fire-alarm box, and also as a watchman's box.

A patent, No. 882,250, for a fire alarm box, has been taken out by M. W. Hamblin, of Milwaukee, Wis., now of New York. Fire alarm box of the type designed to be placed in buildings, and from which an alarm is sent to a main receiving station. Comprises a box adapted to serve both as an alarm box and as a watchman's receiving box.

A patent, No. 883,226, for a fire alarm and signalling system, has been obtained by John D. Nolen, of Toledo, Ohio. Fire-alarm and watchman's signaling system, including a normally wound box so constructed as to be available at all times for use in sending in a fire alarm, and adapted to be manipulated by a watchman in reporting his rounds without sending in a fire alarm.

A patent, No. 881,663, for a fire alarm, has been awarded to George H. Carroll, of Vacaville, Cal. This apparatus consists of a circuit closer, a tension device and a fusible cord connecting the two, the circuit closer comprising a slide and a contact piece in the path thereof, each forming portions of an alarm circuit. The tension device is a spring-wound drum, to which one end of the fusible cord is connected and upon which it is wound.

A patent, No. 880,521, for a fire alarm, has been granted to William Glenck, of Newark, N.J. Particular construction of circuit closer for a fire alarm, making use of a celluloid cap, which is destroyed by fire to release a spring.

A patent, No. 880,662, for an automatic electric fire alarm signal, has been issued to Edward E. Hayden, of Washington, D.C. A circuit closer, having substantially the form of a push button, and including a coil of compound metals which expands when heated to depress the push button.

The proceedings of the twelfth annual convention of the International Association of Municipal Electricians, which met at Norfolk, Va., on July 7, 8 and 9, 1907, has just made its appearance. It is compiled with the usual care that characterizes all of the work of this nature performed by Frank P. Foster, of Corning, N. Y., the secretary of the association, the whole presenting a faithful verbatim report exceptionally well treated, of all that transpired on the occasion in question. The various papers read at the meeting are printed, together with the discussions which followed. Then the reports of the several committes are given, also with the accompanying discussions. The pages of the volume, which number 120, are further enlivened by well-executed engravings of the officers and members of the executive committee, and it is a book that the entire individual membership will value, and the receipt of which will be welcomed. The next convention, that for the current year, will be held at Detroit, Mich., at a date yet to be announced.

Obituary.

W. H. Jones, aged fifty-four years, an operator in the employ of the Western Union Telegraph Company at Columbus, O., died of apoplexy March 21.

First Lieut. David A. Lindsay, U. S. A., Signal Corps, shot and killed himself at San Francisco, April 8. He was a native of Pennsylvania and was thirty-three years of age.

Captain Julien P. Wooten, aged fifty years, who served with distinction as an officer of the Volunteer Signal Corps, United States Army, in the war with Spain, died at Washington, D. C., April 10.

Langdon Smith, better know as "Denver" Smith, formerly a prominent telegrapher, but for twenty-five years past a well-known newspaper correspondent and editorial writer, died at his home in Brooklyn, April 8, aged fifty years.

William O. Callender, the founder of Callender's Cable and Construction Company, Ltd., London, and well known in the United States, died at Bournemouth, England, on March 14, aged eighty-one years.

Edmund W. Firman, a telegrapher well known in Washington and New York, died in the latter city on March 28, aged sixty-seven years. His last place of employment was at the Central Cable Office, 16 Broad street, New York.

H. Baker, retired, for many years superintendent of the telegraph department of the Birmingham post office, England, died March 24. He served under the Electric and International Telegraph Company, prior to that company's business being taken over by the British government in 1870.

Captain R. J. Fowler, a resident of Memphis, Tenn., died March 24 at Wynne, Ark. Captain Fowler was at one time superintendent of the Postal Telegraph-Cable Company at Birmingham. For the past five years he had worked with the company at Memphis as an operator and was well known there.

William Ainsley Kreidler, founder and principal owner of the Western Electrician, Chicago, died at Augusta, Ga., on March 26, aged forty-nine years. He was a man of fine literary tastes, of business ability, and the paper, which he started in 1887, under his management has achieved a notable success. The publication of this journal will be continued without change.

A. H. Babb, aged fifty-nine years, a former well-known and expert telegrapher, died at his home in Cataraugus, N. Y., April 1. He left the telegraph service about twenty years ago, to engage in the grain trade, which he afterward and for sixteen years successfully conducted at Peoria, Ill., retiring therefrom about two months ago on account of ill health. His telegraphic career was a brilliant one, and he was employed in New York, Chicago and other large offices, ranking among the best of operators. He was a prominent Mason and a Mystic Shriner. He never married.

Joseph Howard, Jr., a well known journalist of New York, died on March 31, aged seventy-four years. Mr. Howard will be remembered by telegraphers more especially as the author of the bogus Presidential proclamation during the Civil War, which called for 400,000 additional volunteers, the issuance of which caused the government to seize the Inland Telegraph Company charged with being instrumental in transmitting the supposed message, and marshalling under arrest a number of its officers and men at New York, Washington and other points, in the belief that they were in some occult manner contributory to the fraud.

The Atlantic Telegraph Company.

The Atlantic Telegraph Company operates a line of telegraph from Boston to Portland, Me., with offices, intermediate, at Lowell, Lawrence and Haverhill, in Massachusetts; Exeter, Portsmouth and Dover, in New Hampshire; Biddeford, Old Orchard and Portland, in Maine. It is a four-wire line from Boston to Lowell, and a three-wire line thence to Portland. The short wire from Boston to Lowell, and another wire from Boston to Portland have been leased to brokers, leaving for the company's use two local wires from Boston to Portland for local business, and these are kept reasonably busy. Robert Morton, formerly and for many years of New York, is the general manager of this system, with headquarters at Lowell. Dr. S. C. Gordon, of Portland, is the president of the company, and John J. Hogan, of Lowell, is the treasurer.

The Telegraph in Egypt.

Telegraphic communication in Egypt has greatly increased in recent years; the number of messages despatched in 1906 amounted to 2,300,000, as against 2,000,000 in the previous year. The number of offices was slightly larger, but advance in this direction is hindered owing to the lack of capable operators. In addition to the government telegraph service, there is in Egypt an English cable company which has offices in Cairo, Alexandria and Port Said, and plays an important part in the transmission of messages between Egypt and the chief European countries.

Target practice of the kind that sometimes finds expression in the Dakotas, proved to be too much for the nervous susceptibilities of a railroad night operator, causing his resignation and return East. He had had several adventures with would-be "bad men," and the one that wound up his experience occurred the other night. He was carrying two lanterns for the block signals when two shots rang out and both lights disappeared. While he was not injured, he considered that the shock to his nerves was sufficient to call for a vacation.

The Railroad.

G. C. Todd, trainmaster of the Buffalo division of the New York, Chicago and St. Louis Railroad, has been appointed joint superintendent of telegraph of the New York, Chicago and St. Louis and the Western Union Telegraph Company, with headquarters at Cleveland, Ohio, succeeding R. W. Mitchener, promoted.

In reference to the notice of the fact published in this column on April 1 that train despatching on the division of the Illinois Central Railroad between Kankakee and Chicago was being conducted by telephone, Mr. E. Parsons, assistant superintendent of telegraph of that road, writes: "This is largely a matter of experiment up to the present time, however. So far it has proven an entire success and unless something unforeseen occurs, we expect within a short time to operate trains on a large part of our signal track by the use of telephone instead of the telegraph."

Apropos to the convention of the Railway Telegraph Superintendents, to be held at Montreal, Que., on June 24, 25, 26 and 27, respecting which a lengthy reference appeared in the issue of April 1, it is pertinent to state that if those who attend and who make the side trip to Quebec, wish to remain over night, or indeed to spend a few days in that ancient city, so full of quaint interest to the visitor, it will be well if immmediate application for rooms be made, preferably, as Mr. Camp suggests, at the Chateau Frontenac, as the hotels in that old French town are apt to be crowded at the time of year the convention meets, possibly making the obtaining of sleeping accommodations if deferred until that time quite difficult.

Ignoring the Wisconsin state law, which requires that no telegraph operator engaged in the handling of trains shall work more than eight hours in any consecutive twenty-four hours, one of the railroads of that state has begun working operators nine hours, in compliance with federal law. Since the new United States law regulating the hours of service of all trainmen and operators went into effect, March 4, there has been a question as to whether the state law for operators would take precedence over the federal law, or whether the United States law would supersede the state law. The railroads have expected to take the matter into the courts for a decision, but no action has as yet been started, so far as we can learn, whether in Wisconsin or any other state where eight-hour laws prevail.

It is announced that the Lake Shore and Michigan Southern Railroad Company will operate trains between Erie and Buffalo, a distance of 88 miles, by telephone. It is expected that the change will be brought about within a short time and that if all works well the telephone system will be extended from Erie to Cleveland. J. J. Bernet, general superintendent of the company, states that the change will be made on the main line just as soon as it is possible to install the necessary apparatus. A. S. Ingalls, the assistant general superintendent of the Lake Shore, is now in Albany figuring on the immediate construction of the equipment. The decision to supersede the telegraph with the telephone on the main line of the Lake Shore is the direct result of the very successful experiments conducted on the Lake Erie, Alliance and Wheeling branches during the past five months; likewise on the New York Central out of Albany. The system has worked so very smoothly that the telephone has gained great favor among officials of the entire Vanderbilt system, as well as throughout the country generally.

Reference has been previously made to a combination of telegraph and telephone working on two duplex wires of the Canadian Pacific Railway system, between Montreal and Winnipeg. The telephone service of this combination has since been extended and the present arrangement embraces the following: There are two two hundred and ten-pound copper wires between Montreal and Winnipeg, each duplexed, with repeaters at Fort William, a distance of 995 miles. On these two wires is worked a telephone circuit from Montreal to North Bay, 360 miles, and another independent telephone circuit from North Bay to White River, 384 miles. The Montreal-North Bay telephone circuit has been in use for over a year, but the company was unable to add the section from North Bay to White River until the services of Messrs. R. E. Chetwood and W. E. Athearn, of the American Telephone and Telegraph Company, New York, were brought into requisition, when the problem was solved.

There had never been any difficulty in getting the telephone circuit to work, but previously it was found impossible to avoid interfering with the working of the duplexes.

The question of train despatching by telephone is engaging the attention of the Canadian Pacific Railway Company. Recently W. J. Camp, of Montreal, electrical engineer of the telegraph system of that road, through the courtesy of W. W. Ryder, of Chicago, superintendent of telegraph of the Chicago, Burlington and Quincy Railroad, made a close study of the mode of despatching trains by telephone in vogue on that line. So impressed was Mr. Camp with the utility of the method employed that he submitted a report of the same highly favorable to its adoption on the Canadian road. This has been supplemented by a report of like character rendered by George Rook, of Montreal, inspector of train despatching of the Canadian Pacific. As a result the vice-president of the road has ordered a specimen, or trial, circuit to be equipped between Montreal, Outremont and Farnham, a distance of forty-nine miles of single track road. Work has already been commenced of stringing two two hundred and ten-pound copper wires along this section, and if the experiment proves successful it is proposed to extend this equipment extensively on other portions of the Canadian Pacific system. It is expected that this circuit will be in working order by the time the Superintendents meet at Montreal in June next.

Legal.

The Supreme Court of Texas, Judge Calhoun, has decided against the Western Union Telegraph Company in a suit brought against that corporation by the state to enjoin it from doing business in Texas on the ground that it has no permit to so operate. The permit would cost $100.040 under the Texas laws, as the corporation has a capital stock of $100,000,000.

The Western Union denied liability for the tax on the ground that it is a Federal agency under an act of Congress, as its lines come under the act providing for the use of military post roads, lines, etc. Also that it does not owe the State of Texas a tax based on the entire capital stock of the company because the entire capital stock is not employed in Texas, but only a small part of it, therefore the measure of the correct tax is an apportionment to that state based on the wire mileage therein.

While this decision prohibits interstate business of the telegraph, it does not effect the transmission of Federal interstate messages.

Business Notice.

On page v. of this issue appears an advertisement of the Sandwich Electric Company, of Sandwich, Ill., the same being embellished with an illustration showing the station telegraphone manufactured by this company, the invention of Harry O. Rugh. This ingenious instrument, utilizing the howler call device which has always given the best of satisfaction, is one of the most commercially satisfactory composite telephonic instruments, and is rapidly coming into favor among the railroads, already being extensively used on various systems in this country and Mexico. Railroad telegraph superintendents, train despatchers and others will be especially interested in this instrument, and the company will be glad to furnish any desired information respecting the same and invites correspondence in connection therewith. It will be remembered that the device was shown in interesting exhibit last year at the Atlantic City, N. J., convention of the Railway Telegraph Superintendents.

This company has recently put a telephone selector upon the market, which, working in conjunction with telephones, offers a very satisfactory and practical means for despatching trains by telephone. This device has been put to practical operation upon a very prominent railway system, and results obtained are highly satisfactory.

The selector is designed to operate upon either single or metallic circuits.

Mr. Robert Morrell, superintendent of the West India and Panama Telegraph Company, at St. Thomas, Danish West Indies, in renewing his subscription to Telegraph Age, writes: "I find your paper a most excellent one for general telegraphic information, and it is of the greatest interest to me."

The Hulit Selector.

In the descriptive reference to the Hulit selector published in the issue of April 1, the statement was made that the answer back signal in this device is accomplished at the same time the switch on the selector is restored. This is an error, a correct reading of which would be that the answer back signal is executed instantly the signal reaches the selector, and is done automatically, thereby notifying the office from which the signal was transmitted almost immediately when the signal has been received O. K.

The Dean Rapid Telegraph Company.

Robert L. Dean, president and electrical engineer, and G. E. Gleason, first vice-president, of the Dean Rapid Telegraph Company, of Kansas City, Mo., were in New York a few days since. Mr. Dean reports that his system which is in operation between Kansas City and St. Louis, is gaining in public estimate and commercial use. The tariff charges between the two points named are at the rate of one cent a word, with a minimum charge of twenty cents, such messages being delivered by the company's special messenger service. What are termed "lettergrams" are charged for at the rate of one-half cent a word, with a minimum charge of fifteen cents, the message being delivered by United States mail.

The Electrical Aid Society of Philadelphia.

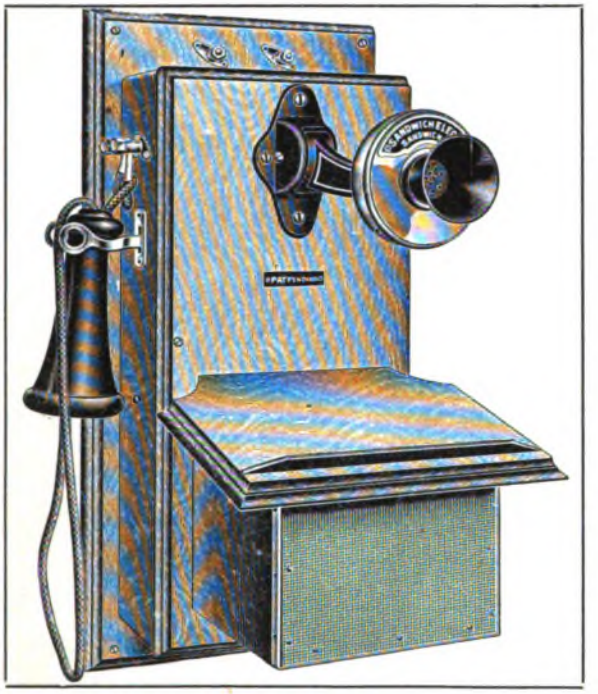
The Electrical Aid Society, of Philadelphia, will hold its eighth annual reception on Tuesday, April 28. The demand for tickets has been so large that the big Mercantile Hall has been engaged for the occasion, and the affair promises to be a brilliant one. There will be covers laid for seven hundred guests at the banquet. The society embraces within its membership, which now numbers seven hundred and fifty, those engaged in the telegraph, the telephone and in the municipal electrical bureau service in the city of Philadelphia. Its financial condition is in excellent shape, the treasury surplus amounting to over $5,000. A. S. Weir is president.

New Stock Quotation Telegraph Building.

Plans have been filed for the new eighteen-story office building to be erected for the Stock Quotation Telegraph Company, diagonally opposite the new Consolidated Exchange at 26 to 28 Beaver street, running through to Marketfield street, New York, part of which site is occupied by its present offices. The building will be 220 feet high, with a frontage of 53.5 feet on Beaver street and with a full depth of 56.2 feet. The edifice is to cost $250,000. Morgan M. O'Brien is the architect.

Two of the Atlantic cables were broken in New York Harbor off Quarantine on Saturday, April 11, being picked up by the anchor of the French line steamer Lorraine.

Railway Composite Apparatus



STATION TELEGRAPHONE NO. 7.
Patent Nos. 831,525
839,210
882,347

Under ordinary conditions this instrument will operate a distance of 100 miles on an iron Morse wire, and twice that distance on copper, and any reasonable number of instruments can be operated on one circuit.

Made in the following types:

Station, Caboose, Portable, Siding, Iron-box : : : :

Kindly furnish us with a diagram of the line upon which you wish such service and we will be pleased to give you the desired information.

SEND FOR OUR LATEST CATALOGUE

THE most commercially satisfactory composite telephone ever devised. All instruments equipped with the howler call and absolutely non-interfering with the Morse circuit.

Four cells of No.6 dry battery is all that is necessary for both talking and signaling, and renewals required only three or four times per year.

All caboose and portable sets equipped with jointed pole and one hundred feet of flexible cord for making connection with the line wire.

We have hundreds of these instruments on many of the largest railroads of this country and Mexico and perfect satisfaction is being obtained.

SELECTIVE CALL

Our selective calling device for telegraph offices is an entirely new innovation, operating on a reversed current; it is not continually in motion and can be operated by the despatcher.

Can be used on both single or metallic circuits.

Will work on the same Morse way wire with no action of mechanical parts excepting when call is being made selectively.

Has been in operation for some time on one of the largest roads in the country and without a failure.

Calls can be made individually, consecutively or in groups.

SANDWICH ELECTRIC COMPANY

SANDWICH, ILL.

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REMITTANCES to Telegraph Age should be made invariably by draft on New York, postal or express money-order, and never by cash loosely enclosed in an envelope. By the latter method money is liable to be lost, and if so remitted is at the risk of the sender.

NEW YORK, APRIL 16, 1908.

The Book Department of Telegraph Age has always been a prominent and carefully conducted feature of this journal. The desire has been and is to furnish our readers and buyers everywhere the readiest means possible of securing such technical books as they may require. Aiding buyers in their selection with advance information, which at all times is cheerfully furnished; promptness in sending books, filling all orders on the same day of their receipt, has brought to this department a generous clientage. Catalogues fully covering the range of books treating on the telegraph, wireless telegraphy, the telephone, as well as those on the general subject of electricity, together with the principal cable codes, will be sent to any one asking for the same.

We desire to state that back numbers of this paper, those issued more than six months prior to any current date, will be charged for at the rate of twenty-five cents apiece when they can be furnished. This price is fixed because of the necessarily limited stock we carry, and of the difficulty we have sometimes in filling an order. Oftentimes the request is for papers of a more or less remote date, with the expectancy of being charged at but ten cents a copy, whereas in order to obtain the desired issue we are ourselves frequently obliged to pay the larger sum named or even more. The growing value of complete files of Telegraph Age should cause our readers to carefully preserve their issues.

It will be welcome information to many of our readers to know that Telegraph Age has in course of preparation for early publication a very full, accurate and comprehensive article treating on the Barclay printer. As the fame of this machine following its extensive introduction in the Western Union service has more generally gone abroad, numerous inquiries have reached us, especially during the past few months, for information regarding the same. All such will be fully answered in the forthcoming article, which will be illustrated. The publication of the article has been deferred in order that it might embrace necessary descriptive explanations of the completed instrument in all of its full fruition of development.

Although it has occurred of late that commercial telegraphers have found employment to some extent in the railway service, it nevertheless appears, according to statements made by railroad officials in different parts of the country, that one of the effects of the enforcement of the federal nine-hour law is to make clear the fact that in frequent instances the railroads have been retaining a really unnecessary number of operators on their payrolls, as well as maintaining certain offices that might profitably be dispensed with. Thus it would seem up to the present time that the adoption of the new law, so far at least as it effects the condition of the railroad telegraph operator is concerned, is on the whole inimicable to, rather than promotive of, his welfare, inasmuch as its action shuts off not only opportunities for employment, but likewise curtails earning capacity on the part of the individual by reason of inelastic hours of service.

Thoughts for Reflection Affecting the Telegraph Service.

We frequently have had occasion to refer to the superior expert abilities combined with a general fund of all-around information possessed by telegraph operators of, say, twenty-five or thirty years and more ago, as compared with the inferior qualities of the same class and poor resulting service, so often met with to-day. The fact of the existence of such differences cannot, unfortunately, be gainsaid; it is becoming a subject of common remark, and the seriousness of the situation involved, because of its reality, is one that cannot be afforded to be overlooked in any summing up of the question and in arriving at an estimate determining the governing of present telegraphic conditions. The intelligent man observant of the situation, who is mindful of the evolution of change that is taking place in the calibre of the average individual at the key—a change portentious perhaps with possibilities sufficient to affect the destiny of the telegraph itself, has much to engage his attention and perplex his mind.

Of late years the field of the telegraph has narrowed materially. Competition, sharp, aggressive and constant, has been experienced because of the development of the telephone, its widening sphere of operation and the efficiency of service afforded. This rivalry in method of transmission has told heavily against the telegraph. Then, again, the fast mail, considered in connection with its spe-

cial delivery features, closely linking points as widely separated as New York and Chicago, has had much to do with cutting into the volume of the telegraph business. Especially has this been true since the strike, when the turbulent operators were moving heaven and earth in their endeavor to heap obloquy upon the telegraph. The mail, while slower, of course, in its operation, yet in frequent over-night distances has nevertheless served admirably in conveying information that formerly was transmitted by wire.

Yet the desirability of the telegraph as a means of quick and accurate communication has not lost its potency, even though a certain measure of inefficiency and slowness of operation has mitigated against its usefulness to a degree permitting competing agencies to gain advantages over the older system that never should have occurred. It is not difficult to trace, in part at least, the trouble to its source. There is a manifest lack of conscientious work and effort and *esprit du corps* on the part of the personnel in the telegraph service that is responsible in direct and large ratio for the retrograde influences that have cut down the volume of business formerly handled by the telegraph ,and that in consequence have curtailed its earnings.

While there are natural causes antagonizing the telegraph that call for untiring ingenuity of astute management to contend against, the fact nevertheless remains that within its own bosom there is maintained and sheltered an element that is exerting an influence detrimental to its welfare. We have no disposition to be hypercritical in our strictures, for we have in mind the thousands of faithful workers in telegraph employ whose devotion to duty is not only above all criticism, but is entitled to words only of warm commendation and praise due to intelligence of mind, to honorable motive and loyalty of service, attributes of character that alone can influence and be productive of favorable results. As a rule, the longevity of service of all such proves and is a guarantee not only of their ability, but of their zealousness and integrity of purpose.

But of late years there has drifted into the service a class of operators whose presence at the key should be regarded as a distinct menace to the well-being of all interests, as it likewise constitutes an affront to the loyal and capable workers with whom they are brought in contact. Those referred to are mainly young in years, inexperienced in the profession, careless and indifferent in system, with no especial aim in life, yet because possessing certain mechanical qualifications in the manipulation of a typewriter, familiarity with which somehow seemingly secures to them the charge of circuits which some among the number should never be entrusted.

Outside competition which is to be expected and which is normal and fair, is one thing, but inside indifference and lack of fidelity, the exact antithesis of which should be the governing impulse of every honorable employe, yet when absent constitutes in the aggregate a force of embarrassment of much magnitude, is monstrous. Conditions in the telegraph service reflecting its past and present, with possibly a bearing on its future, furnish an object lesson which carries much food for meditative thought.

Government Ownership of the Telegraph.

The Central Labor Union of Washington, D. C., is calling upon all national and international labor organizations to write to Congressman Jesse Overstreet with a view to overcoming his objections to a hearing before his committee on the subject of government ownership of the telegraph. The circular that is being sent out is as follows:

"To the secretaries of international and national unions in the United States—Dear Sirs and Brothers: There have been several bills introduced in Congress this winter for the governmental ownership of the telegraphs of the country. These bills have been referred to the committee on post offices and post roads, of which Congressman Overstreet of Indiana is chairman. Mr. Overstreet, when requested by the two members of Congress who are members of the Commercial Telegraphers' Union, its international president, as well as the legislative committee of the Central Labor Union of Washington, D. C., to give them a hearing before the committee, so that they might present to the committee reasons why such a law should pass, refused their request. I was, therefore, directed by the Central Labor Union to communicate with the secretaries of the International and national organizations and make the request that they write to Mr. Overstreet and ask him to grant a hearing on these bills. A letter from you to him will be appreciated by those interested in this legislation."

The circular is signed by Sam De Nedrey, secretary-organizer of the Washington Central Labor Union.

William Bradfield, the president of the local telegraphers' union at Washington, was roundly denounced recently by the Central Labor Union of that city for asserting that the majority of telegraphers of this country did not favor governmental ownership. As a matter of fact, Mr. Bradfield was correct in his statement, and Congressman Overstreet in the position he has taken in refusing to bring a bill before the committee of which he is the chairman, having in view the taking over of the telegraphs by the government, is but exercising common horse sense in the matter.

The motive governing the action of the Central Labor Union is not actuated by any motive of patriotism but simply by a desire to "get even" with the telegraph companies.

F. S. Lewis, manager of the Western Union Telegraph Company at Niagara Falls, N. Y., in renewing his subscription for another year, says that "under no circumstances would I be willing to do without Telegraph Age."

The Semi-Centennial of the Laying of the First Atlantic Cable.

This year marks the fiftieth anniversary of the opening of the first Atlantic cable over which messages were successfully sent. Tuesday, March 10, was the fifty-fourth anniversary of the signing of the original contracts for the organization of the first company having for its object the electrical harnessing of the old and new worlds to each other, for it was on the night of March 10, 1854, around the table in the dining-room of Cyrus W. Field, father of the cable, at his residence in Gramercy Park, that Peter Cooper, Moses Taylor, Marshall O. Roberts and Chandler White, with David Dudley Field present as counsel, signed the original contracts and joined their faith, money and reputation as sane men with the one idea, fortune, courage and indomitable will of Cyrus W. Field.

It was on that very day that Frederick N. Gisborne, of Montreal, the discouraged promoter of the Newfoundland Telegraph Company, whose object had been merely to connect St. John's, N. F., with the United States, says the New York World, surrendered his charter to the "mad-brained enthusiast" of Gramercy Park, who with his five friends seated around his English oak table, organized the New York, Newfoundland and London Telegraph Company.

The longest submarine cable in the world then lay between Dover and Calais, crossing the English Channel, not over thirty miles wide between those points.

On a part of the original estate of the layer of the first ocean wire lives to-day at Ardsley-on-the-Hudson, the sole survivor out of seven children of Cyrus West Field, Mrs. Isabella Field Judson, widow of William Francis Judson. The house is well stocked with mementoes of the originator of the cable. Here are the heavy oak dining table and the chairs, used by the original incorporators fifty-four years ago; the family portraits Mr. Field mortgaged on the outcome of his supposed hair-brained scheme, innumerable memorabilia, gifts, souvenirs, chests of books, pamphlets, original documents, pictures, letters, resolutions, speeches, menus, tributes, copies of laws and contracts, biographical sketches and recollections, some published and others in manuscript, of the wedding of the hemispheres written by Mrs. Judson and others.

Here, with the exception of one piece which is in the Field collection, Smithsonian Institution, at Washington, is the service of silver inscribed "From George W. Peabody to Cyrus W. Field."

Mrs. Judson is the treasurer of a wealth of oral information concerning the beginnings of the costly and discouraging attempts at hands across the sea.

In late years, notably in a book written by Mr. Bright, attempts have been put forth to show that the Atlantic cable had almost wholly its conception, birth and construction in the brains of Englishmen, an assertion which the loyal daughter protests with her perfect knowledge of the circumstances and events of a half century ago.

"My father often said," begins his child, "that it might have been thought of before he was born, but he was the originator of that work. For years before the final triumph, from the time I was eight years old until my first son was born, whenever we children wanted a new doll, a sunbonnet or a gown it was always 'Wait until the cable is laid.'

"As often as my uncle, David Dudley Field, came to our house his first toast at dinner always was, 'Brother Cyrus, let's have our toast first to the success of the Atlantic cable,' and as the years went on Uncle Dudley's toast was lengthened to this form: 'Brother Cyrus, let's have our first toast to the success of the Atlantic cable and then to the world encircling. You must put a cable around the globe.'"

It was Matthew Dickinson Field, elder brother and eminent engineer, who suggested while in New York, in January, 1854, to Cyrus W. Field, the project of a telegraph across Newfoundland as a long step toward Europe, the germ of latter day results. At the Astor House Matthew Field, returning from a residence in the South, had met the downcast F. N. Gisborne, who had failed for lack of capital to build a telegraph line across Newfoundland to St. John's, there to connect with steamers for Ireland, which would bring the news of Europe to America within a week. Matthew Field took Gisborne to the Gramercy Park house and introduced him to his brother, who had already made in the paper business all he had set out to lay by for himself and family—$250,000.

After Mr. Gisborne had gone on that night in January, 1854, the Atlantic cable, as Cyrus W. Field in his library turned over his globe, was born in his brain. For thirteen years thereafter, night or day, waking or dreaming, ashore or afloat, while eating, drinking or walking or talking, the Atlantic cable was his uppermost thought. He was so charged with the electricity of this new affection that his friends and some of his relatives called it an affliction. Upon the chimerical realization of his hopes he laid his fortune, his honor and his magnificent energy. In those thirteen years he crossed the Atlantic forty times and made half as many trips to Newfoundland.

It is the testimony of his daughter that when his friends saw Mr. Field coming their way they would cross to the other side of the street to escape from him. "If he gets a chance," they said, "he will talk us deaf, dumb and blind about his cable."

One of his friends, a deacon, wrote down from his home in Stockbridge, Mass., the original home of Cyrus W. Field, to Mrs. Field, to shut up her husband in an asylum, for he had evidently gone mad.

"I should call my father's work the triumph of genius over science," says Mrs. Judson, "for so it seems to be to me. My father never claimed

that he was in any way a scientist and it simply was his patience, energy and perseverance that carried him on to the end."

Chandler White died in 1855. His place in the promotion of the cable enterprise was taken by Wilson G. Hunt, who stuck fast to the end. The promoter, Chandler White, and David Dudley Field went to Newfoundland in March, of 1854, and almost lost their lives in a blizzard off St. John's. The first to shake hands with them was Attorney-General Edward M. Archibald, afterward Sir Edward, for twenty-five years British Consul-General at New York.

The "neighbors" kept pouring their money into the swamps of Newfoundland until they had sunk hundreds of thousands, and the projector more than anybody else. The overland construction of four hundred miles took three years, and the first attempt, in 1855, to lay a cable under the Bay of St. Lawrence was a failure. In the next year another try was successful. It was one link in a chain.

Having reached the end of his material resources in America, the hardest part of the road lay before him—the luring of capital in England from its strong boxes to stretch the magical metallic fibers over the unseen bed of the big ocean.

For scientific assurance Mr. Field had a survey of 1853, showing a plateau between Ireland and Newfoundland, the opinion of Dr. Morse of ten years before, that the distance of 2,000 miles was not too great for the swift course of lightning, and the cautious opinion of Lieutenant Maury, of the Observatory at Washington, who conceded the possibility of the electric communication, but would not concede a time calm enough, a sea smooth enough and a wire long enough or a ship big enough to lay the coil.

Faraday was at first about the only man in England to give Cyrus W. Field a cheering word. When Mr. Field asked him how long it would take for the current to pass he said, "Possibly one second." The Yankee projector drew up the articles of the Atlantic Telegraph Company, and with Professor Morse called in 1856 on Lord Clarendon at the Foreign Office. Lord Clarendon, impressed more by the American's enthusiasm than by the feasibility of his plans, said: "But suppose you do not succeed; that you make the attempt and fail; your cable lost at the bottom of the ocean—then what will you do?"

"Charge it to profit and loss and go to work to *lay* another," was the answer.

Mr. Field visited James Wilson, Secretary of the Treasury, and as a result the British government guaranteed $70,000 a year for messages sent, and the father of the cable returned to a worse than lukewarm country and paid into the treasury of the company $440,000. In England Mr. Field enlisted in the cause William Thomson, then a mere electrician, who later became Sir William Thomson, now mourned, after his death recently, as the great Lord Kelvin.

After a lot of hustling and the passage of necessary laws, the United States named the steamships Niagara and Susquehanna, and Great Britain the Agamemnon and the Leopard to lay the cable. In August, 1857, just three hundred and sixty-five years from the day Columbus sailed from Spain to discover America, the ships steamed from Valentia Bay, Ireland.

The Niagara paid out first. The cable broke, and on the following Monday, the start having been made on Wednesday, at a point three hundred and fifty miles from the Irish coast, the frigate fell into the trough of the sea, rose on the swell and the strain again snapped the cable. With flags at half mast the flotilla returned to Valentia Bay and the coils were taken out of the holds, and the United States warships returned to America.

In the year 1858 four ships proceeded from Valentia to the middle of the Atlantic, where, stern to stern, the Agamemnon and the Niagara spliced cable ends from their tanks, and the ships started, two and two, in opposite directions. The Agamemnon pointed one way and the Niagara the other.

The cables parted almost before they were joined, not only once, but three times. The ships went back to Valentia and this time even the vice-president of the company refused to have anything more to do with it. When it was proposed to relay the cable he left the directors' room.

But they started again, and by a coincidence the Niagara landed her end of the cable at Trinity Bay, N. F., August 5, 1858, on the same day that the Agamemnon landed her end at Valentia Bay, Ireland.

The first message sent on that immortal day was: "England and America are united by telegraph. Glory to God in the highest, and on earth peace and good will toward men." Queen Victoria and President Buchanan exchanged congratulations and the country went wild with enthusiasm and Cyrus W. Field, who had been looked upon as a madman, was glorified.

In all seven hundred and thirty-two messages were sent over this cable. It was worked to death. Mr. Field on September 1, 1858, received this cablegram:

"Cyrus W. Field, New York:

"The directors are on their way to Valentia to make arrangements for opening the wire to the public. They convey through the cable to you and your fellow citizens their hearty congratulations and good wishes and cordial sympathy in your joyous celebration of the great international work."

The words "and good wishes and cordial sympathy" were accidentally omitted in Mrs. Judson's "Cyrus W. Field, His Life and Work."

It was the last distinct message that ever passed over the cable of 1858, the first cable, 1,950 statute miles long, without a single break, that spanned the Atlantic ocean.

But New York and the country celebrated just the same on that day. There was more than half a million jubilant people in the streets. Broadway was a garden of female beauty, for there

was to be a parade. The cable layers, British naval officers, and the Jack Tars of the Niagara, bearing a model of their frigate, a big coil of cable, were all in line. There were ceremonies in the Crystal Palace, fireworks in City Hall Park, a torchlight procession of firemen, illuminations and a big dinner to Cyrus W. Field at the Metropolitan Hotel. While the celebration was in progress the City Hall caught fire and was badly damaged.

Speaking of the landing of the Newfoundland end of the cable of 1858, Mrs. Judson says that her father always insisted on making a sharp distinction between Trinity Bay and Heart's Content and the Bay of Bull's Arms, N. F., and it was at the last place that the cable of August 5, 1858, was brought ashore.

The Niagara, under command of Captain Hudson, left St. John's on August 12, 1858, with a small coil still in the tank, her Union Jack flying and a long streamer of blue, bearing in white letters twelve inches in length, "Atlantic Telegraph." Her father was anxious to give credit to everybody who had helped him, even to the sailors, who had christened him "Our Sister of Charity."

"Early on the morning of August 18," continues Mrs. Judson, "the Niagara anchored off the Battery, and my father immediately landed and drove up Broadway, delighted to see the decorations and amused to learn that he was the man of the day and hour.

"'This,' said my father, 'is in strange contrast with the years when my friends to avoid meeting me pointedly crossed the street when I came in sight.'

"He had been only a short time in the welcome seclusion of his home on the north side of Gramercy Park, No. 123 East Twenty-first street (the house still remains), from which he had been absent eight months, and a nephew had brought him numberless letters and telegraph messages, when his brothers told him the reporters were clamoring and would not be denied. 'They must see you and hear from your own lips the story of the Atlantic telegraph. Those are their orders,' his brothers told him.

"As the reporters entered the room Mr. Field told them they could have half an hour and no longer.

"One of the first questions asked of him was, 'When did you first think of undertaking the work, who have been with you in the enterprise and to whom should credit be given outside of yourself?'

"My father replied: 'Why, bless your soul, look at those boxes. They are full of papers and all give the history in some form of the last four years. Who first thought of the cable? Very likely one was talked about before I was born. This may interest you. On July 30 we found the Niagara had run several miles out of her course. She was paying out too much cable, and it was then discovered that our compasses did not work, and why? Because there was too much local attraction caused by the amount of cable that we had on board. We signaled to the Gorgon, and Capt. Dayman piloted us to the end. Four days and nights he remained at his post.

"'Everything that I have in the world—this house and even the portraits of my father and mother, are mortgaged, and the money has gone into this enterprise. I thought that was generally known,' my father told the reporters.

"Do you care to hear of our welcome at Trinity Bay? I landed near the telegraph station at two o'clock in the morning of August 5 and walked to the house, half a mile distant, through a wilderness, not a person being visible on the beach, and neither did we hear the sound of a voice until we reached our destination. The operators sent from London were asleep. They had no faith in our work, and they had not even unpacked their trunks.

"My father, David Dudley Field, and I were left alone, and it was then that his brother asked my father two questions, 'Have you ever felt discouraged and ready to give up?' and 'Do you know what your English friends think of your capacity for work?'

"'I cannot,' replied my father, 'as yet bring my mind to face or talk of what we may have been able to accomplish. At times it seems to me more than I can grasp, and I can simply say, 'What has God wrought?' To the second question he replied: 'My friends said that I never rested. They said: "We leave you at work in the evening and find you working the next morning." This was far easier for me than to keep still. The dread of leaving something undone, that I failed to think of what was required for the work, even the thought of that overpowered me.'

"On the evening of August 20 when Captain Hudson and Chief Engineer Everett were dining at our house my father told us how the cable of 1858 was not successfully laid until a second attempt had been made, for after the Agamemnon and the Niagara had on the first attempt kept their tryst in mid-Atlantic and a splice had been made the cable had broken three times, the last time when the ships were 200 miles apart. The ships returned to Ireland, and it was some time before he could persuade the directors to allow him to make another attempt. The Niagara sailed from Queenstown on July 17, 1858, and nobody gave her a cheer.

"...essful splicing was made half seas over at 10 A. M., on Thursday, July 29, 1858."

"After dinner that evening a crowd gathered outside the house to serenade my father, who, with his guests, stepped outside on the balcony. ... read this message, received on that day from Ireland:

"'Valentia Bay, August 19, 1858.

"'To Cyrus W. Field, Esq., New York:

"'The directors have just met . They heartily congratulate you on your success.

"SAWARD.'"

Mrs. Judson recalls how her father, with his brothers, family and friends, all climbed into a

stage on the day of the celebration and rode to Trinity Church to give thanks.

The current over the cable of 1858 during its brief life had always flickered, but it had demonstrated the feasibility of the proposition. The high potentiality used caused induction and rendered the wire useless. Then came the mirror-speaking instrument—a tiny steel magnet with mirror, suspended by a human hair, whose flashes, dots on one side, dashes on the other, were read on a screen behind which was planted a lamp. Thus William Thomson, invented his recorder, and it was demonstrated that a drop of water, a tear, was sufficient to generate a current that would carry across the ocean.

One important message had been sent over the cable of 1858 that saved the English government a lot of money and trouble. That was the orders to the two British regiments in garrison in the provinces that danger from the rebellion in India was past and their orders to sail for home were countermanded.

Cyrus W. Field's fortune had all gone, his firm had failed, he had disposed of what shares in the Atlantic Telegraph Company he could dispose of and would have sold them all if he could have found a market. The public had become ashamed of its late enthusiasm. It had no more faith in an ocean submarine cable than multitudes to-day have in wireless telegraphy for long distances. The Civil War was on, arrangements were made to use Cape Race as a connecting point of communication with passing steamers, even as it is used to-day as a relay point for flashing the news of passing ships ashore, but fifty years ago the means of communication between vessel and cape was a small steamer bearing despatches in watertight cases, tossed overboard from a fleeting liner, instead of the mystic etheric waves.

Meanwhile the father of the cable was constantly crossing the Atlantic addressing boards of trade and public meetings everywhere, still harping on his cable. With the lights of new experience a cable was coiled on the Great Eastern, which was placed in command of Captain, later Sir James Anderson. She sailed in 1865, reeled off one hundred and fifty miles a day, and after 1,200 miles had been laid, the cable was broken. The Great Eastern went back to England and in the next year, 1866, the cable held and was laid at the very moment of the crisis of the war between Austria and Prussia.

England, from that day, July, 1866, when a landing was made at Heart's Content, Trinity Bay, has been clasped with hooks of steel to the United States.

Then followed the most daring attempt at submarine engineering, the fishing for the cable lost in 1865. They dragged the bottom two miles under the ship, and it took two hours for the grapple to reach the bottom. They got it up once, a slimy thing, but it broke away and went back to its bed of ooze, again casting for it thirty times they got it again and this time they held it and spliced it. These two cables of 1865 and 1866 worked perfectly for upward of twenty-seven years. The cables of 1858, 1865 1866 and 1869 have been long abandoned and the oldest one working to-day is that of 1873.

When the enterprise began to pay large dividends Mr. Field reaped some of the fruits of his courage and perseverance, but Mrs. Judson avers her father never made much money out of it.

From the beginning, when in May, 1854, the New York, Newfoundland and London Telegraph Company had a capital of $1,500,000 subscribed, to the present day, when at least one billion of dollars is invested in ocean cables, some strides have been made, and David Dudley Field's inevitable first toast "To the success of the Atlantic cable and then to the world encircling," has been realized.

Where Socialism Has Failed.

So many in this country are clamoring for the introduction of Socialism in one form and another, including federal and municipal ownership, that the experience the city of Brest, France, has passed through, is not without value as an object lesson. That city was considered an ideal one from every point of view as being well adapted for successfully carring out the essentials of that doctrine. It was a costly failure.

For three years that city of 70,000 inhabitants, has been under the control of the Socialists. They municipalized everything—from the serving of milk for the babies to the running of the theatres. All public affairs were conducted extravagantly. At the arsenal 10,000 men were employed to do the work of 1,000. While in 1904 only 5,000 persons received poor relief, in 1906 nearly 23,000 persons—one-third of the population—were supported by public charity. The municipal theatre expended $8,000 a year more than its receipts. Milk was sold in the poor parts of the town for 3 cents a litre that cost the municipality 7 cents. In three years the building trade fell off 90 per cent., and the local customs decreased 60 per cent. Three-fourths of a surplus of $90,000 in the city's treasury when the Socialists came into power, have disappeared and no one can tell what became of the money.

At the last election the Socialists gave up control of the city and the new administration will have a job to rescue it from bankruptcy. Considerable time must elapse before the town can expect to be more prosperous. But it will be longer before it forgets its experience with Socialism.

Mr. O. C. Greene, superintendent of telegraph, Northern Pacific Railway, St. Paul, Minn., in renewing his subscription for the current year, writes: "It is always with genuine satisfaction that I pay this bill. I can speak in the highest terms of your paper. I find it always both helpful and interesting. I trust that you may have many prosperous years to come in its publication It is doing a great service."

Before the Telegraph Was Invented.

To compare the present with the ancient means of communication is to appreciate that you are living in the commercial twentieth century.

One of the first systems of aerial telegraphy was attempted in the fifteenth century. The origator was Amontons, at that time considered one of the cleverest scientists of the world. He developed a system of signal telegraphy so that a message could be sent from Paris to Rome in three hours. Those who assisted in the transmission of the message along the line were unable to tell the nature of the message. Posts were placed from Paris across the Alps at consecutive points, where men were stationed with telescopes. Different signals, representing combinations of letters, were run up at each post. The man at the other end, seeing the signal, placed a similar one before his post, and so the message was carried to its destination. The key to the signal was known only to those who sent the message in Paris and the recipients a thousand miles away. Amontons was not encouraged in his work by the puffy, gouty functionaries of the time and discontinued his efforts.

Perhaps the real inaugurators of the system of long-distance transmission of messages were the Gauls. If you leave your office some afternoon and see a friend across the street and cry, "Oh, there!" you are using a system of telegraphy in vogue in Europe until 1792. The cry of "huppa," from which the English "Oh, there!" was derived, was the mouth telegraphy of the ancient Franks, by which they sent a message at the rate of one hundred and fifty miles a day.

A number of men, stationed at certain intervals over a long stretch of country, sent messages, one to the other, so quickly that Caesar, in his Commentaries, said the natives forwarded warnings of his approach at the rate of fifty leagues from sunrise to sunset. At night they used signal fires or "hauchees." While tympans were beaten, fires were lighted from mountain top to mountain top.

To the tourist wandering through France and over the Pyrenees into Spain the old towers which appear from time to time across the mountain may seem purposeless and strange. Yet they are vestiges of the greatest system of old-time aerial telegraphy in existence. These towers—both square and round—are situated on the most prominent hillocks. Up to 1844—when experiments assured the success of the telegraph—these towers were the means of communication in France. In that year there were five hundred and thirty-five stations. The towers were two stories high, with index signals of light wood or iron mounted at the top of a pole on the roof.

This system was originated by Claude Chappe, and was presented to the National Assembly of France on March 22, 1792. Chappe had prepared a secret vocabulary of 9,999 words, represented by characters. The convention conducted a series of trials, and, elated by what its members called the simplicity of the scheme, adopted it. At that time France was at war with nearly the whole of Europe. The first telegraphic national message was received by Carnot, grandfather of a recent French president, telling of the restoration of Conde to the republic.

The news of the taking of Brussels by the French was transmitted from that city to Paris in twenty-five minutes. Messages were sent by placing signals at the top of the poles on the towers. The telegrapher at the one end mounted a ladder and changed them by hand. There was always some one on watch on the towers to note the signals from the others. The line of stations was extended by the first Bonaparte to Milan, Italy, and thence to Mayencé, Germany. As the French army retreated the telegraph posts were destroyed.

During the Crimean war (1854) a system of sending messages by the use of semaphores was adopted, by which messages were conveyed from one camp of the allied armies to another. Arms extended from a framework of wood, which could be operated by wires by a man below in a tent. By lifting or lowering the arms messages were sent from one division to another.

While the efficiency and success of the electric telegraph was assured by 1850, and wires were strung up all over Northern France, it was not until the end of that year that they were opened for public use. Even when private individuals were allowed to send messages they were required to give proof of their identity, but the secrecy of the despatches were considered inviolable. A few months after the wires were given for public use the first submarine cable was laid. —Express Gazette.

The Telegraph in Porto Rico.

The telegraph system of Porto Rico, since the occupation of that island by the American army, has made rapid strides, so that at the prestn time about fifty towns and cities have telegraph offices. Telephones, again, connect outlying districts with these, so that practically every part of the island can be communicated with. There are three private telephone systems in operation, in the north, south and east. By the terms of the old Spanish concessions for telephones in San Juan, Ponce and Majaquey, the system of these three towns will become the property of the insular government within less than ten years, and the other lines can be bought over by the government whenever it thinks fit.

In Argentina at the end of 1907 the national telegraph lines comprised 24,072 kilometers, with a total length of conductors of 57,551 kilometers. The total number of messages for the year was 10,420,012, equivalent to 1.6 per inhabitant, and 417 per kilometer of line. The revenue for the year was $2,255,375.

Wireless Telegraph Plant at the United States Naval Academy.

The wireless station at the United States Naval Academy, Annapolis, Maryland, forms one of a chain of stations under government control extending on the Atlantic coast from Frenchmen's Bay, Me., to Galveston, Tex., says Lieut.-Commander W. H. G. Bullard, U. S. N., in the Electrical World. Other stations in this chain are located at Guantanamo, Cuba; San Juan, Porto Rico, Culebra and Colon.

The station was established in June, 1904, not as a transmitting station for long distance, but rather as a relay station to forward such messages as it would be able to pick up from other stations or from vessels bound up or down the coast.

For this reason the power installed was small, the station set having only a rated capacity of 2.4 kilowatts. This power is obtained from a storage battery furnished by the Electric Storage Battery Company of Philadelphia, and consists of forty cells, giving a normal voltage of eighty volts. When occasion demands, this battery is charged from power obtained from the main power station supplying the Naval Academy with light and heat.

The transmitting circuit contains the induction coil, condensers and spark gap of the well-known Slaby-Arco type. The direct current from the storage battery is led to the primary of the induction coil, and the make-and-break is effected by means of a mercury turbine interrupter, making 1,600 revolutions per minute. With a line voltage of eighty volts, a maximum of about twenty-five amperes may be used in the primary windings. The condenser consists of seven leyden jars, connected in multiple with a total capacity of .014 microfarad. The inductance is a spiral conductor of No. 8 copper wire, consisting of 9.9 turns of a mean diameter of seventeen inches. The spark gap is a single break between zinc electrodes with a normal length of ¾ centimeter and a maximum length of 2½ centimeters.

The receiving device now used is of the De Forest type of electrolytic cell used in connection with the head telephones of the Schmidt-Wilckes make. This cell uses a Wollaston wire, glass jacketed, and of .006 inch diameter, as the anode, and a platinum wire as the cathode, in a solution of pure nitric acid. In connection with this coil is used a primary battery, with potentiometer. Associated with the detector in the receiving circuit is a capacity .005 microfarad with a variable inductance of two coils of copper wire wound with 500 turns on each coil.

The aerial is a loop of a total length of 1,034 feet, consisting of four wires of phosphor bronze. It has a horizontal length of 100 feet and a vertical length of 166 feet. The aerial is coupled direct to the transmitter inductance and has a natural wave length of 335 meters. The wave length ordinarily used is 318 meters for the lower hump and 420 for the upper. With the coupled circuit for 425 meters, the lower hump is 348 meters and the upper hump is 500 meters.

Joseph Schnell, of Binghamton.

Joseph Schnell, now engaged in the drug business at Binghamton, N. Y., a former telegrapher, and a member of the United States Military Telegraph Corps, in recently renewing his subscription to Telegraph Age, writes pleasantly to say: "I don't see how I could get along without the paper now; it seems like renewing an old acquaintance. It has brought me in touch with many dear old friends of the telegraphic fraternity. In a former letter you refer to Mr. W. A. M. Grier, of Brooklyn, as having given the Schnell brothers, Thad, Andrew and myself, our first instructions in telegraphy at Milesburg, Pa., on the then newly built line called the Susquehanna River, North and West Branch Telegraph Company. That was right, he did. I have never seen him since, and often wondered what had become of him. I am glad to know he is still on earth, and is, I hope, prosperous. I remember him very well as a truly polished gentleman. When you see him again please give him my kindest regards. Show him the enclosed picture and ask him if he can recognize in it the youngest of the three brothers he instructed in the art of telegraphy away back in the 50's. I should love dearly to see him."

Joseph Schnell was born in Clearfield Borough, Pa., in 1842. He became a druggist's clerk in 1856 and while so employed learned the art of telegraphy. In 1861 he enlisted in the Bellefonte, Pa., Fencibles. At the end of three months' service he re-enlisted and was soon detailed in the service of the United States Military Telegraph Corps. In 1863 he was detailed to provost marshal duty at Williamsport, Pa., where he remained until mustered out in 1864. He then went to Binghamton, where he has been closely identified with the business interests of that city. Mr. Schnell made a creditable record as district supervisor of the United States census of 1890, his work being especially commended by the Washington authorities. He was reappointed for the same work in 1900. Mr. Schnell is a member of the G. A. R. and other organizations, and is esteemed as one of Binghamton's best and most loyal citizens.

New Western Union Office at Oklahoma City.

The new office of the Western Union Telegraph Company, at Oklahoma City, of which Harry Robinson is manager, occupied for the first time on March 8, is declared to be one of the best equipped telegraph offices west of the Mississippi River. The office employs about thirty operators. The operating tables having a capacity of one hundred, and seventy wires are cut in on the switchboard. Eleven motor generators displace 3,600 gravity batteries formerly used. Everything in the office is new. Besides the ordinary telegraph apparatus, the company has installed burglar and night watch machinery, and in a short time will start its sprinkler service.

A Chapter of Reminiscence.

BY DR. L. M. RHEEM, OF MINNEAPOLIS.

(Continued from April 1.)

I have somewhere among my plunder of the long ago, the letter Superintendent Dickey wrote me when he received my monthly report. He patted me on the head, and on the back and all over, for the great increase in receipts, which in those days a manager did not have to explain.

It happened shortly afterwards that one of the brokers missed connection with his message, although it had been delivered correctly. Then another one missed, and then another. This made it necessary to extend and elaborate the scheme a little. The elaboration consisted of placing various articles in the office window so they could be seen from the street; each article stood for a certain active stock; as, Unabridged Dictionary, Hale and Norcross, Horseshoe, Ophir, Paper Collar, Con. Vir., and so on through a list of ten or twelve articles. The absence, presence of position of these different articles indicated either no change, or from one to four points up or down. The recipients of the messages had to memorize these articles which were arranged in the window as soon as the messages were received.

It was a liberal education in human nature to see three or four brokers, each one of which knew that he was the only man receiving a private message, go by the window in company and take an observation of that window without turning their heads, missing a step, or arousing the suspicions of his comrades.

While all this trouble was taken for the sole purpose of accumulating a few paltry dollars, the way the scheme worked was simply entrancing; George Muirson and I got so expert that we could play on that collection of junk until it sounded like a Beethoven symphony on a midsummer night, on a lagoon in Venice.

But real good things can't last forever; and in a few weeks the brokers discovered that when everybody in the game had a dead sure thing, the game became uninteresting and the pickings very light. Then came the cataclysm. I was waited upon by a committee of three brokers, two of whom were private message men, and asked to tell upon my honor whether I was delivering the stock list to any members of the exchange. As this question was equivalent to several things, I became genuinely indignant, and told the committee that I was not delivering the stock list to any members of the exchange, and furthermore that I did not propose to rest quietly under implied charges to that effect: that I was a first cousin of Caeser's wife, and that our entire family, consanguineous and collateral, had always gone short on suspicion; at which declaration the two private message men breathed much easier.

The next question was: "Had any of the members of the exchange been receiving private messages? To this I replied that "the rules of the company especially prohibited the giving out of any information whatsoever, concerning the business of its patrons." I was requested to accompany the committee to the exchange, which I did. Upon our arrival at the exchange, we found that during the absence of the committee, the remaining members of the exchange had been holding a sort of love feast; everybody had confessed up, and all of them were busy in the formulation of a "gentleman's agreement," stipulating that "Never again, etc., etc., etc."

When I left the exchange, I did not feel nearly so optimistic concerning the future of the Denver office as I had the day before. The future looked dark; but that afternoon I received a letter from Mr. Dickey granting my request for a leave of absence to visit the Centennial Exposition, and asking me whether I would accept the position of manager of the Omaha office on my return, relieving Mortimer A. McCoy, who was in bad health. Would I? You know it; I was so afraid he might change his mind that I wired him that I would. That afternoon one of the deepest dungeons of the Chateu d'If would have looked good to me. I wanted to get away where I could think.

In a few days I was relieved by Mr. Edward Lackner, who had to explain the falling off in receipts in the report for that month; I do not know what his explanation was, as I was so busy packing up to get away. When I got back to Omaha from the East, the first thing Mr. Dickey said to me was that the receipts at the Denver office had dropped off frightfully just as soon as I left there. I was so afraid that he would send me back that I told him the whole story, which, of course, squared things for Lackner.

Those brokers in Denver were good fellows, and when I left town, a number of them went to the station to see me off, and the journey east was made much pleasanter by the cigars and blandishments with which they packed my grip.

Mr. B. F. Woodward, Mr. Huyck and Mr. Armstrong, managers of the Western Union Telegraph Company, and other old time telegraphers in Denver at the time, I also remember for their courtesies.

Denver at this time was the Mecca for persons suffering with pulmonary tuberculosis; among those who came there seeking a cure for the malady was George Armstrong, an old time telegrapher from Cincinnati, who passed away a year or two after the time of which I write. During my stay in Denver George and I became fast friends; we shared a room at the Wentworth House in the upper end of the town. A great many consumptives made their headquarters at this hotel, which George used to call the "coughin' shop." Armstrong was one of the few men I have met who had overcome the fear of death; he knew that he had to die in a short time and was prepared to meet his fate without a quaver. His quaint and humorous way of expressing himself on this subject is something I will never forget.

It is a comparatively easy matter to meet death

when the bands are playing, the flags flying and the crowd cheering; a man has an idea that perhaps in the distant future, a memorial may be raised to commemorate his heroism, and that he may be held up to future generations as the typification of courage. It is a far different matter to sit down to a tete-a-tete and a game with death, prepared to play the game to a finish; there are no bands playing, flags flying, nor any great amount of cheering; you simply look right into his eyes and wait month after month, or perhaps year after year, and you feel that the prospect of a memorial to your courage is very remote.

But what is this thing we call death anyway? In its last analysis is it anything more than passing from one room to another? No. That being the case, why is it that we cannot leave the room like a gentleman, with a pleasant "Good-bye, I'll see you later," to those we leave behind us? That's the way I want to go out when my time comes, but whether I will or not is another matter. Modern methods present so many different means of communication between the two rooms, that it has always been difficult for me to pick my route. I carry what we call life and accident insurance; some of my life insurance policies say I have got to die within a certain prescribed area or I get nothing; I did not "read the policy" when I got it as the print was too fine, or I never would have taken it. After I had it a few years I discovered that I could only die between the Tropic of Cancer and the Arctic Circle; when I read that clause I felt myself shrink quite a little, as the authorized space seemed pretty small.

My accident policy is much better; that gives me permission to go into the other room by any way, shape, manner or form and in any part of the known world, provided I slip in accidentally, i. e., when nobody is looking; and if I ride in on a street car, railroad train, passenger elevator or steamship, whether the same is operated or propelled by steam, electicity or any other power, or on any kind of a public conveyance, I get two for one. That certainly has a pleasing appearance to me; reminds me of the double O in a game they used to play in Denver and Cheyenne, in which "twenty could play as well as one."

This, however, is a digression which you must overlook.

Previous to my going to Denver it had never rained there; at least that is what they told me. But my coming seemed to sort of loosen things; for a short time after my arrival it started in to rain as if it were never going to do anything else. We got word from Boulder that "Cherry Creek was coming down." When this news got on the street, everybody quit work and started for Cherry Creek, which was a little rivulet between high sand banks, and hardly deserved the name of a creek.

I did not know what was going to happen, but went with the rest of the population; shortly some one cried "Here she comes!" The "she" was a wall of water about fifteen feet high filling the banks full and coming at a pace that made it a really terrifying spectacle. There were two foot-bridges and a rather expensive wagon bridge across the creek; the flood tossed the two foot-bridges out of the way, and to save the wagon bridge from destruction by some large warehouses that were on the caving banks just above the bridge, the mayor ordered the warehouses set on fire and destroyed; as night had fallen the picture presented by the rushing waters and the lurid flames was one well worth seeing. The next morning little Cherry was back in the middle of its bed again needing water as badly as anyone after a night out.

Speaking of this rain and flood reminds me of a phenomenon that I ran across out there that is peculiar; it was that they could not get a perfect "ground." Now for some reason or other this has always jarred upon my finer sensibilities; it appears so incongruous, that in a country where you can get a perfect anything, from pancakes to potatoes, you cannot get a perfect ground. It makes a man feel that he has nothing to stand on. At Cheyenne, I have been told, in order to get a ground they have to go way out in the country to a creek where they have an enormous plate of copper buried in the creek bottom. I have never seen the creek or the copper plate, but I believe them to be there just as much as I believe any other story about that country.

On account of this geological freak, we were never able to tell when the lines were down; if the weather was dry the wire would work just as well on the ground as on the poles; if it was wet you raised the adjustment a little and kept on working. Once in a while you might reach the range of the adjusting spring and then the lineman had to get busy and pick things up.

I think it was during the rain previously mentioned that this happened; I was working with Cheyenne on an adjustment so high that it made me dizzy every time I would look at the floor, when the operator told me that the line was down and that John G. Morse, the lineman, would be down from Cheyenne in a day or so and fix it up. John came down and cleared the line; when I asked him what he had found, he said the wire had been down in Boulder Creek and broken. Now this is hard to believe, but there we had been working over a broken wire and using about thirty feet of pure water as a patch; if that isn't the prize reminiscence I don't know what it is.

As I say, this thing worried me and I wanted to find out the reason for it; I pestered every one I thought ought to know anything about it and accumulated as fancy a collection of reasons as any one could wish for, but they were unsatisfying. I asked C. H. Summers about it once and he said he would explain it to me; he took a piece of clip paper and filled it full of logarithms, square roots, cube roots, algebraical equations and geological dewdads, explained his hieroglyphics, and asked me if I understood it now. I told him "Yes." But to be honest I didn't.

I felt just like a two-year-old kid chasing a runaway milk wagon for a drink of milk; I could

not catch on; but for fear Summers might hear of it, I quit pestering people about it. I thought about Summers' explanation for nearly twenty years before I caught on to the "string" in it. In the meantime I had figured out the reason for myself.

The cause of the phenomenon is a solution of continuity between the Dikellocephalus and the Laurentian, primarily established by a latitudinal displacement of the vacuuminal center created by the reaction between the unessentiality of the constant atmospherical components and the gases produced by the excess of calorics liberated, resulting in a raising or warping of the edges of the superior formation.

I have found some persons who have disputed this, but none of them have ever lived in either Denver or Cheyenne.

The Denver of '76 has long since passed away, and the empire builders who made it possible have nearly all gone to join the great majority; their descendants, however, have replaced the old town with a beautiful city that cannot be surpassed for beauty of location and pleasant environments by any city of these great United States. The men who have the guiding of its destinies are filled with the faith of their forefathers, and have the ability needed for the development of the Empire of the West, than which there is no greater in the world.

I often wish I had stayed there when I was there; and in looking over this imperfect and poorly written chronicle, it occurs to me that my readers will wish that I had. In a new country many things happen unexpectedly, and in their happening certain individuals are permanently eliminated; I might have been "one of the ones." A clairvoyant told me one time that I had escaped serious throat trouble by moving; she did not say whether the throat trouble was the kind they used to have out there in connection with a lariat and a telegraph pole, or not; but any way, I moved and we will have to let it go at that.

Report of the American Telephone and Telegraph Company.

The annual report of the American Telephone and Telegraph Company for 1907 shows total profits of $23,479,290 and a balance available for dividends of $16,269,388, or the equivalent of 10.67 per cent. on the company's outstanding $152,528,000 of capital stock, as against 9.86 per cent. earned in 1906 on $131,551,000 of stock. The year's profits exceeded those of 1906 by $5,621,603 and the gain in surplus was $2,550,041. The aggregate surplus as of December 31, 1907, was $30,738,418.

The extent to which the telephone system was developed during the year is clearly brought out by the following statistical comparative figures

	1907.	1906.	1905.
Exchanges	5,108	4,889	4,532
*Aerial wire	3,057,138	2,574,571	2,183,167
*Underground wires	3,883,051	3,241,571	2,585,742
*Marine wire	6,322	11,600	9,373
*Total wire	6,946,511	6,007,732	4,778,282
No. circuits	1,541,727	1,384,175	1,135,449
No. employees	88,274	90,324	74,718
No. stations	3,035,533	2,727,289	2,241,367
No. daily cons	18,130,803	16,478,058	13,543,468

* Miles.

President Vail in his remarks says that the number of stations connected to the system during the year was 3,839,000, or an increase of 768,340 stations. Although the increase in the number of subscriber stations directly operated was considerably less than in 1906, by reason of a more rigid collection of bills and a more careful scrutiny of applicants, there was a decided improvement in this class of subscribers.

Of the $2,921,400 expended for construction, $44,184,800 was for exchanges, $4,426,400 for toll lines and $4,310,200 for land and buildings. During the year $36,626,667 was applied out of revenue to maintenance and reconstruction purposes. Careful estimates made of the construction requirements for the coming year indicate that the maximum expenditure will be well within the company's available resources.

The gross earnings of the operating companies —not including the long-distance business of the Bell Telephone Company of Canadá—are given as $120,753,200, an increase over the preceding year of $15,311,600. The balance earned by these companies available for dividends was $25,819,700 and the undivided profits amounted to $6,613,600, or a gain of $897,400 over those for 1906. The company's present outstanding 1,525,280 shares are distributed among 23,469 shareholders —an increase of 5,275 over January 1, 1907, and an average of sixty-five shares to each stockholder. More than three-quarters of the entire share capital is now held in New England.

The obligations of the American Telephone and its associate companies are stated at $554,939,000, against which there stands working assets and sundry investments valued at $101,074,000 and plant investments representing $453,865,000 and having an appraised value of $488,296,000. President Vail discussed at length and corrects many misapprehensions regarding the telephone business and the resultant repeated legislative attempts made to regulate rates; he talks about various other phases of the company's policy and notes the fact that the year 1907 practically completed the thirtieth year of corporate organized work in the telephone field.

Mr. Richard O'Brien, assistant superintendent of the Western Union Telegraph Company, Scranton, Pa., remarks in a recent letter: "I take great pleasure in forwarding check covering my subscription to March, 1909. They tell me Wall Street is full of great bargains just now, but for a good investment give me Telegraph Age every time."

The Yetman Typewriter-Transmitter.

The Yetman Typewriter-Transmitter Company, manufacturers of the telegraph transmitting device bearing the name of Yetman, formerly located at Ilion, N. Y., has lately removed its plant from that point to North Adams, Mass. In this thriving New England town, with all the advantages accruing from fine location, to ownership of property and to a complete equipment of machinery specially designed for the purposes intended, the future manufacture of this well-now-known instrument, which originally reached a large sale, may be considered as successfully reinaugurated.

The factory at North Adams is a large brick building with 40,000 feet of floor space. It was constructed for the manufacture of tools, and is well adopted to the business. It has an up-to-date power plant, and the heating, lighting and plumbing are in excellent condition. Connected with the building is a vacant lot of sufficient size to construct a building twice the size of the one occupied. The original cost of this property was over seventy-five thousand dollars, and it could not be reproduced to-day for that amount.

The company owns a complete factory equipment for the manufacture of the typewriter-transmitter. It consists of machinery, jigs, punches and dies, and special tools complete to manufacture the entire machine after the most modern and economical methods, and could not be reproduced for $350,000. The special tools were designed and made by the most expert and experienced typewriter mechanics known to the art, and this most essential part of the factory equipment alone cost $120,000. The machines which have been produced from these tools have been uniformly successful, showing that the equipment while practically new is perfect in practical operation.

The manufacturing end of the business is in charge of Mr. Charles E. Yetman, vice-president and general manager of the company, who has had charge of the manufacture of the machine from the beginning. He will devote his entire time to the factory. He has under him in each department the ablest men in the typewriter field—men who have been engaged in this line all their lives and were connected with the manufacture of the first fifteen hundred machines, and the construction of the tools and appliances with which they were made.

The first floor of the factory is devoted to the making and assembling of the lower part or base of the typewriter, including key levers, finger keys, etc. The second floor is given up to the making of special tools, screws, rivets and other small parts used in making typewriters. This department is fully equipped with automatic screw machines and other machinery of the latest models. The assembling room is on the third floor. Here the complete typewriter machine is put together. The transmitting part of the machine is assembled on this floor. The fourth floor is called the "finishing department." Here typewriters are aligned, assembled with the transmitting mechanism and finished as complete typewriter-transmitters. The method of final inspection is very thorough and is attended to in this department. In addition to the main divisions the nickel-plating, polishing, and japanning departments are fully equipped and each in charge of competent men.

The company's organization for exploiting the Yetman typewriter-transmitter is well under way. General salesmen have been sent out in different parts of the country and it is expected that before long local agents will represent the company at all important telegraph points. New machines are being shipped to operators who are using the Yetman typewriter-transmitter with entire satisfaction. The company's facilities for manufacturing make it possible to fill at once all orders for machines and extra parts. The main offices of the company are located at North Adams, Mass.

The Yetman typewriter-transmitter, the invention of Mr. Charles E. Yetman, who served some years as a practical railroad telegrapher, consists of two machines in one case—a perfect visible writing machine, built for speed and durability, and a transmitter of Morse signals that takes the place of the telegraph key. It can be instantly connected with any telegraph circuit without requiring any change of equipment.

The transmitter and the typewriter are operated by the same keyboard, and may be used separately, or both may be used together to produce a simultaneous mechanically correct copy of the matter being transmitted. This is a most valuable feature, and one that strongly appeals to train despatchers, who are required to do an unusual amount of sending from memory, and who must depend upon an assistant to make a record of each message or order sent. The speed of the transmitter-sent signals may be instantly controlled by turning a governor button, conveniently located, to adapt them to the varying wire conditions, and the ability of the receiving operators.

The typewriter part of the machine has been subjected to the severest possible tests, covering a period of many years of practical work. Every letter, every word, and every line written, is in plain sight from the time the first letter is struck, until the paper has been removed from the machine. That this feature of "visible" writing is invaluable in a typewriter to be used for telegraph purposes is admitted by all.

The carriage is returned by one direct downward movement of a lever at the right of the keyboard; the line spacing is accomplished automatically at the same time by the same motion. The paper feed has been constructed with special reference to the rapid handling of telegraph blanks. The carriage moves upon ball-bearings, and the typebars, which are the real life of a typewriter, are connected into their hangers by ball-bearings. The touch is exceedingly light, and is absolutely uniform in every part of the

keyboard. The transmitting typewriter excels in speed, ease and uniformity of touch, permanence of alignment, manifolding and durability.

The transmitter part of the transmitting typewriter makes it possible for a telegraph operator to transmit Morse signals which are absolutely perfect by touching the keys on the keyboard. The touch used is the ordinary quick staccato typewriter touch. Each Morse signal, and the elements of which it is made up, namely, dash, dot and space, are transmitted by the mechanism of the transmitter with absolute accuracy and uniformity, independently of the skill of the operator. The space between the signals, however, is entirely within his control, so that he can space the letters in difficult words more widely than in others, and use that fine judgment possessed by all intelligent operators which is absolutely inseparable from efficient telegraph work, and which no mechanism will probably ever be able to supply.

The rate of speed at which each signal is transmitted is also governed by the mechanism of the transmitter and is always uniform. All rates of speed from very slow to very fast are secured by turning a button at the right of the transmitter. The proportion between the length of the dot, dash and space, however, always remains the same, and is so arranged as to make the signal firm, or as firm as it is possible for a signal to be made at the rate of speed used. This firmness and the absolute uniformity of the transmitter-made signals, insures their carrying through the longest circuits and through the largest number of sets of repeaters, at a much higher rate of speed than is possible by hand.

The transmitting typewriter was designed to do, and is now doing, for telegraphers what the typewriter did for penmen and the linotype for typesetters. It provides telegraph operators with a device for transmitting Morse signals over a telegraph wire by use of a keyboard, enabling them with one unskilled touch on any key to produce the equivalent of that letter in perfect Morse upon the wire.

It reduces the effort to send fully fifty per cent. even to the most perfect and easiest of hand senders. It places the operator on a permanent sending basis and enables him to cope with the heaviest kind of work with the least effort, accomplish with more skill and greater ease as much work as an expert hand sender. It positively prevents any operator from losing his "grip" or from having any trouble with his arm. It enables the man who has already lost his "grip" to become an expert sender again. The old timer may be brought to life with all his former vigor and made capable of doing at an advanced age as much work and better work than in his youth. The Yetman transmitter is the reverse of the hand-sending key, inasmuch as one's skill increases as long as the machine is used while the effort diminishes. It will do for operators on the sending side as much as has already been done by the typewriter for the receiver.

The Yetman transmitter lightens the work of the receiver for the reason that all combinations are eliminated. At the end of a day's work you will feel much less fatigued than if sending by hand because you have been using both arms, both hands and all the fingers of each hand to do the work of two or three fingers in a cramped position. This equalizes the effort to both arms, both hands and all the fingers. To use the Yetman transmitter properly is merely the acquirement of correct finger habits and this serves a double purpose in scientifically training the operator to become both a rapid sender and receiver.

The Nerve Strain of the Telegraph Operator.

Few people know the real facts touching the life of a telegraph operator or the effect of their work on their health. The character of this work not only acts unfavorably, but probably it is the most deleterious in its effects upon the operator to that of any other trade or profession. Why? Because of the uninterrupted continuance of nerve tension, monotony of sound, close fixity of attention, the work being the reception and brain arrangement of monotonous "clicking," demanding very close and arduous attention.

That this condition of concentrated attention is most acutely enervating is the unanimous testimony of physiologists. During severe pressure of work upon the operator there is an interference with normal breathing, increased action of the heart, and rush of blood to the head. You know how we breathe when we wake up in the night and think we hear somebody moving about the house; and are trying to locate them by the sound. You know how we breathe (especially women) when a messenger delivers a telegram, and want to know who it is from, but afraid to open it.

Well, that is exactly the way telegraph operators breathe when over-crowded with business and when the sending operator is speeding with great rapidity. In the course of years all this tells on the constitution and shortens life. Telegraphers who follow their occupation for years die younger than other people. The statistics of the Royal Commission in England states that out of every one hundred operators who die there before they are fifty-five years old, sixty die from heart disease, consumption or paralysis. It is true, however, that some operators die, not from their exacting work, but from dissipation. In this respect operators themselves owe a duty to themselves—to get plenty of fresh air, exercise, plenty of sleep, and to abstain from all intoxicants in order to care for the nervous system in the best possible manner.

The city of Philadelphia, having hatched up a bill of $16,000 against one of the telegraph companies, has kindly granted the offender thirty days in which to pay this tidy sum, under penalty of having its poles chopped down.

Telegraphers' Cramp.

The Telegraph Chronicle, of London, prints what it terms a "memorandum" relative to telegraphers' cramp, a subject discussed by J. M. Robertson, M. P., an old telegrapher, and addressed by him to the post office (telegraph) authorities. It was said that unless measures were adopted to ameliorate this trouble in the English telegraph service the disease should be scheduled as "one due to occupation."

In this connection it may be observed that from statistics obtainable it is apparent that telegraphers' or writers' cramp, is more prevalent in England than in the United States, notwithstanding the fact that the operators in this country outnumber those in Great Britain at least five to one. In America telegraphers are quick to adopt devices designed to overcome this malady. Hence transmitting machines are freely employed by operators threatened with this form of paralysis, engendered by the constant use of the key. Dot-making machines have no doubt saved the arms of many good telegraphers from permanent disability. The tendency so frequently noted in the case of the English operator to succumb to this dread form of cramp may be attributed, we believe, in large measure to the up and down motion of the hand and arm in manipulating the telegraph key. A remedy for the evil complained of might be found by the adoption of improved sending apparatus. When it is remembered that excellent results in overcoming this trouble have been achieved in this country by the use of automatic sending devices, it would appear that like attainment would follow their more general use in England.

What Mr. Robertson had to say follows in part:

"The alarming increase in the number of cases of 'telegraphers' cramp' demands that some searching inquiry should be made into the causes, and that earnest consideration be given to the possibilities of prevention, and alleviation of the conditions which are producing such disastrous results. The physical and mental strain consequent upon the arduous and exacting duties of an expert operator, has been freely admitted, yet so far no attempt has been made to deal with the question.

"Charles E. Yetman, the inventor of the most recent typo-telegraphic apparatus, in his treatment of the subject of cramp, has made the following statement: 'An expert operator must move one set of muscles in his right hand 800 times in sending forty words per minute, 48,000 times per hour, and 318,000 times per day. It is not difficult, then, to believe that an occupation which demands this unnatural and continued stress, on a comparatively small portion of the human system, should in a number of years of constant application tend to produce both nervous and physical deterioration of the worker. Indeed, it is not unusual to find that a few years have been sufficient to play havoc with the arm and nervous system of a young operator. The magnitude of the postal telegraph service, and the local conditions obtaining thereto, illustrate in the most marked degree both the cause and effect."

* * *

"Operators who are laboring under cramp at the present time should not be threatened with punishment because of their misfortune, but should be placed in branches where specialization is essential, such as counter delivery and circulation duties, and in which sections work of a valuable character is performed.

"In conclusion, it is submitted that although the post office possesses almost a monopoly of telegraphy in Great Britain, and although telegraph cramp is regarded as a distressing malady, resulting often in total incapacitation of an operator, nothing has been done officially to inquire into its causation. The post office medical department should be asked to report on the question, and serious steps should be taken to discover not merely how most usefully to employ afflicted operators, but what preventative steps can be taken.

It is quite possible that experienced medical men having a knowledge of the conditions under which operators work, and almost daily seeing them engaged in their duties (if there are any such) would be able to help the staff and the department in dealing with this form of disease."

Oriental Secret Telegraphy.

The hope that the movements of troops against the Zakka-Khels will prove "a regular surprise" to these erring tribesmen leaves out of account the mystic Oriental power of rapidly and secretly communicating news over vast distances.

An instance of this strange faculty was furnished during the Indian frontier expedition against the Waziris in 1895. Seventy-five miles as the crow flies and 120 miles by mountain roads from their base at Sheik Budin the British troops defeated the Waziris. Heavy mist prevented the news of this success being heliographed until the following day, when, communication being opened up, the British officer at Sheik Budin anticipated the news of the victory by stating he had been informed of it by natives on the very evening of its occurrence.

The most famous instance of this sort is associated with the assassination of Lord Mayo by a convict in the Andaman Islands. Within a few hours of his murder an English official at Simla was told by his Pathan servant that the viceroy was dead. Telegrams announcing the news did not arrive until the next day.

How such messages are transmitted is hidden from Europeans, but again and again in India, as also in Egypt during the Sudanese campaigns and in South Africa during the Boer War, the authenticity and speed in such native telegraphy were proved.

The Military Telegraph in the Civil War.

PART ONE.

As the period of the Civil War lapses more and more into the indefinite past of long ago, there is danger of burying in oblivion much that transpired during that stormy time that it is well to preserve. The animosities awakened by causes long since and forever settled, yet which developed into dreadful actualities of war, are all gone, stripped of their harshness and softened by time, leaving events as they occurred only as historical data over which the student of to-day ponders and wonders. The part that the faithful little band of military telegraphers (small by comparison with the great armies engaged), acted in that mighty drama of life, possess an interest within the telegraphic environment that as time passes and the number remaining who were engeged in such service grows appreciably smaller and smaller as each year passes, appeals with a pathos of feeling and patriotic pride over which we in these later days delight to linger in loving recall.

Colonel William R. Plum, of Lombard, Ill., the historian of the military telegraphers, whose book, "The Military Telegraph During the Civil War in the United States," preserves in careful and abundant chronicle the history of that body of telegraphers, to whose loyalty, devotion and intelligence, displayed in behalf of their country during the critical years of war, entitles them to be held in memory's hightest esteem—Colonel Plum, we say, has collected during a life largely devoted to the cause of the military telegrapher an immense amount of reminiscent matter of war experiences contributed in letter form by those who were actors in the scenes which they describe. It was originally intended to embrace all this in the book referred to, but its great volume precluded such employment of the matter, and it has never been published. Instinct with the interest always attaching to the dramatic touch of personal encounter, this correspondence furnishes an interesting viewpoint concerning historic events in which many of the telegraphers were humble yet important actors. It will be observed that they shared the dangers of war equally with the regularly enlisted soldiers.

This great mass of correspondence furnished by writers, some of whom are living and many dead, has been turned over by Colonel Plum to Telegraph Age for publication in such form and sequence as it sees fit. Without any attempt to edit the letters and present the resultant whole in any form of story, it has been determined to print individual letters, believing that such a course will best preserve the charm of personality as expressed in originality of utterance. It is probable that the publication of these letters will be continued through many future issues of this journal, and we feel sure that they will be received with very general interest and approval.

The first letter selected for publication is one from the late Jesse H. Bunnell, who organized and was for many years the head of the now incorporated company bearing his name. It was written in New York, and bears the date of July 21, 1879. Without preliminary, Mr. Bunnell plunges at once into his subject, as follows:

"I arrived at Annapolis May 9, 1861. It was my first appearance at the front. I was at home in Massillon, Ohio, on a vacation from the Pittsburg office, where I had been working a 'through' Cincinnati and Louisville press circuit for a year previous, when I learned of the need for operators for the United States military telegraph. I went on at once to Philadelphia and from there was immediately sent to General Benjamin F. Butler at Annapolis. At that point I remained about a month when I was again sent to follow General Butler at Fort Monroe. At that time I was seventeen years old. On my arrival at Annapolis I immediately wrote to my chums, A. Harper Caldwell and C. W. Jacques, who soon joined me. I remained at Fort Monroe and at Hampton until about August 1, when I went to Washington. During the shipment of McClellan's army to Fort Monroe I had an office on board the steamer Commodore at the wharf at Alexandria, Va., where we kept up communication with headquarters as to the progress of the work of shipping the army on the transports. Then with A. Harper Caldwell and C. W. Jacques and myself as McClellan's headquarters operators, we went to take part in the Peninsula campaign. At Yorktown I was on duty alone after two A. M., on the morning of the evacuation, and received from various posts the startling messages in rapid succession, which woke first, the general staff and then the whole vast army to a morning rush after the enemy and into the fight at Williamsburgh. After the usual run of incidents of those times, such as camping, moving, building lines, etc., my next interesting adventure was at the second of the seven days' fight—the battle of Gaines Mill. Possibly you (Colonel Plum) can find the messages I sent and received that afternoon. I had been detailed at General Porter's headquarters for a few days before his falling back, and on the morning of that movement, having no horse, I had missed the line of march and lost my way. About twelve or one o'clock, however, I struck the road on which a telegraph line was strung. At this point I also found that a line of battle was being formed for a stand about one hundred yards to my rear. I therefore cut the wire, inserted the instrument, sat down behind a tree and called McClellan's headquarters. Harper said they regarded my opening communication at that moment as a godsend. I had no orderlies. General McClellan sent me a message to stop the first mounted officer or man passing along that road and order him in his (McClellan's) name to take a message to General Porter to send me fifteen orderlies and communicate with him by telegraph. This I did, and for several hours I sat very close to that tree and sent and received many messages as to the progress of the battle of which I was getting a very fair sample from the continuous roar of musketry, cannon, cheers, yells and any number of overshot shells, solid shot and bullets, until suddenly we all 'came away' together in a 'rush.' The whole line was driven back at that point pell mell. I reached headquarters at 11 o'clock

that night. This was, I think, January 21, 1862. I was taken sick at Hamson's landing, and returned home to recuperate for a few weeks, afterwards joining General McClellan in the Maryland campaign.

"I left the army of the Potomac headquarters at Fredericksburg to join General Rosecrans' headquarters at Stone River and was accompanied by John Holdredge and Manager "Bob" Talbot. At Chattanooga I took charge of headquarters office in the field. Colonel John C. Van Duzer was the superintendent of the military telegraph. At the battle of Chickamauga I had a wire at Widow Glen's house (this house is still standing, preserved by the government in a national reservation). McBaldwin was with me. General Rosecrans made this house his headquarters during the first afternoon's battle at Chickamauga. Upon the retreat into Chattanooga Colonel Van Duzer, at the head of all the telegraph builders and operators, worked all that night running a trip wire about ten inches from the ground in front of the entire line of works, placing the line of wire a few feet in front of the abbatis.

"Following these events there came a period of starvation in Chattanooga, with plenty of hard work, etc. Then came Sherman's march to Atlanta, with the usual run of adventures and labors, until when, on August 16, 1864, my health being again in a precarious condition, I came north and returned not again."

Making Secret Cable Codes.

In view of the recent theft from the American legation at Bucharest of a copy of the state department's cipher, used in private correspondence between Washington and the American diplomats abroad, one of the few expert code makers in this city, says the New York Evening Post, was asked whether it would be possible for a person to interpret the government's code, if he were unfamiliar with it. The code maker thought the cipher might easily be read, if it were a cryptograph, as he believed it to be, and the silence of Washington with regard to the stolen copy gave point to his remarks and seemed to indicate the significance of the "leak."

Code makers are frequently called upon to decipher messages which have puzzled their recipients, and they usually succeed in making a sensible interpretation; indeed, they are able to read any cipher unless it has been altered by preconcerted signals. This is one reason why business houses require absolute secrecy on the part of the experts they employ to make their codes, and why the books are so carefully guarded thereafter.

Since the early days of cabling, business men have found it convenient and economical to convey information by means of single words or phrases. Such a word as "Jones" might mean "The price of wheat has gone up," and contain other facts regarding the grain market. But these codes were crude as compared with those to be developed later, and now a man may have a little book, weighing half a pound or less, representing millions of expressions.

It is estimated that 300,000 persons in this country use codes regularly, and some firms pay $100,000 and even $250,000 a year for cabling. Thus the code expert's profesion is important, and it is necessary for him to be able readily to grasp the details of a business when he begins to evolve a code for its requirements.

Codes may be divided into four classes. First, there is the private code, which is written especially for an individual or firm; second, there is the general conversation code, of which thousands are printed, some selling as high as 75,000 copies, and bringing as much profit as a "best selling novel." The first general code of importance was written in 1888, and it has been followed by many others of similar design. Copies of each general code are, of course, identical, and for the buyer to communicate with the seller, or vice versa, it is necessary only for them to agree to use a certain book.

A third type is a public code designed for a specific line of business. There are codes for the grain and timber trades, for mining, and even for the theater.

The fourth type is the blank code made up of code words with blank lines attached, or the numerical system, which enables a person to make a code covering his individual requirements, if he chooses to do so. In speaking of the various classes, a code-maker said:

"The science of coding is made to follow certain vital points. They are economy, secrecy, comprehensiveness, and safety in telegraphing. Safety means the use of words which a telegraph operator can't mutilate easily. In the making of a code, one point or another is frequently sacrificed; for instance, economy for comprehensiveness, or vice versa. In certain businesses, like that of Stock Exchange houses, all points may be subordinated to rapidity. A stock broker's code must be so arranged that the user can readily find what he wants. A message is sent to London, and an answer is received in from three to four minutes; so you will see the necessity for a code that will work quickly."

Before the International Telegraph Conference of 1903, code makers were supposed to use only dictionary words, with a maximum of ten letters, from the English, French, Dutch, Italian, Portuguese, Spanish, and Latin languages. In their compilations they gathered a set number of phrases, which were supposed to cover the general requirements of a business. It will readily be seen that a certain individuality entered into the compilation of general codes, because in their efforts to reduce the bulk of the books authors climinated those phrases which they did not think necessary.

For instance, if an author thought that a phrase in the negative was imperative he would put it in the code, but if he did not consider the affirmative of the same phrase to be imperative he would

leave it out. If he would have incorporated every expression in the first, second, and third persons, with questions and answers, past, present, and future, negative and affirmative, his code, as thick and heavy as it was, would have reached immense proportions.

The expansion of modern business and the complexity of methods demanded more elastic codes than could be compiled from the dictionary words permitted. Accordingly, the code makers devised spurious words to convey numbers, each giving a meaning or several meanings, which were obtained by consulting a key. By the terms of an international agreement, cable companies were not supposed to accept spurious words except at double rates, but they winked at the regulation and thus compilations of the new type of code were unofficially encouraged.

Nevertheless, the convention of 1903 talked of adopting an official "vocabulary" which would eliminate spurious words for all time, but cablers the world over protested that such action would mean the rewriting of all codes at great expense, and would, moreover, tend to restrict the use of the cable as a business medium. Their point was so well taken that the convention granted code makers the right to use artificial combinations of words instead of dictionary words, and they speedily took advantage of their opportunity.

By a combination of letters or syllables code makers are now able to put into a small volume millions of expressions in the first, second and third persons, with questions and answers, past, present and future, negative and affirmative; indeed, one code of 497 pages contains more than 400,000,000 expressions, or nearly 1,000,000 to a page of forty-seven lines.

There are many ways of maintaining the secrecy of a code, and some are so comprehensive that a message received at 10 A. M. would convey a different meaning if it were received an hour later. It has been found that safety lies in sending a message which means something different from the actual translation. Thus a man who stole a message and was able to make a translation such as "When will you ship?" might readily think that he had the correct meaning, whereas the person to whom it was addressed would read: "Have you made arrangements, etc.,"

The simplest form by which changes like these are made is through a system of preconcerted signals. On Monday, perhaps, a man will know that his signals should be read ten words back, on Tuesday ten words forward. Obviously, an unscrupulous person into whose hands such a message might fall would be unable to make use of it.

Perhaps the smallest codes are those used by stock brokers who deal with foreign clients in about twenty active stocks. Figures instead of words are used, and they cover names of stocks, prices, market conditions, etc., all typewritten or printed on a slip of paper that will fit into a pocketbook.

Cable companies will not accept more than five figures in a group, and expert code men say there is danger in telegraphing numerals, although their use is convenient to brokers who wish to work rapidly. Each single figure of a group has a specific meaning, and should one be changed accidentally by a cable operator the intended message would become another. Consequently, through mutilation a man might buy when he should sell or he might buy at a wrong price.

The cost of compiling codes ranges from $100 to $20,000, and some large corporations are in the possession of private codes for which they have paid from $5,000 upward. An expert code maker, who works in the office of a client, receives, as a rule, $25 for a day of four hours, two hours in the morning and two in the afternoon. He does not work four hours at a stretch, on account of the nervous energy and vitality his calling demands. A house in business from thirty to forty years expects the compiler to incorporate all its requirements in a code within a short space of time, and the strain upon him is therefore heavy. If you ask him, he will say he is underpaid.

In order to insure absolute secrecy in the compilation of its code a firm will sometimes require an affidavit from the code maker, stating that all sheets and papers bearing memorandums have been delivered, and that the type has been destroyed after printing.

Codes are first turned out in typewritten form, and then printed, the total cost being about $10 a page. If the work is extremely technical, or the compiler is compelled to visit another city in pursuing his subject, the cost of producing the whole work is necessarily greater.

Some merchants employ cable clerks who are competent to make codes, and they doubtless save a good deal of money in this way, especially when they are obliged to send a number of copies to correspondents and customers in foreign lands. A West Indian merchant, who, by the way, makes his own codes, and distributes them among his customers, said the other day that he regarded them not only as economical conveniences, but as "getters" of business. "If a man," he said, "forgets to order something by mail, he will not hesitate to use the cable when by doing so he can save time and expend only a dollar or two."

Banking firms and express companies which sell letters of credit also have codes printed for the convenience of their customers, and business men nowadays take their codes to sea with the purpose of sending messages by wireless, in case of necessity.

According to a list recently published the grand total of Mr. Carnegie's gifts to date is $150,000,000. The largest of these is for libraries in the United States, the total being $30,000,000. The donations thus far to the Carnegie Institute of Pittsburg foot up to $16,000,000; another item is $2,000,000 for the "Polytechnic School" in Pittsburg.

A Wireless Communication from Mars.

A good story is told by Fred. Catlin, of New York, one of the best known of old-time telegraphers. The story for which he is responsible relates to recent wireless telegraphic communication with the planet Mars. Mr. Catlin evidently read an item in a recent issue of Telegraph Age in which it was stated that a French scientific body has offered a prize of $20.000 for any one who would devise a method of communicating with the various planets. The scientists barred the planet Mars on the ground that communication with that planet had already been established by wireless telegraphy. This startling announcement evidently interested Mr. Catlin. He began an investigation to learn how the planet Mars had been reached and who were the fortunate telegraphers intrusted to the care of so important a circuit. He found the solution at one of the wireless telegraph stations not a thousand miles from this city.

The story goes that one evening in the fall of 1907, when the planet Mars was nearer to the earth than it had been for many years, the operator in charge of the station was testing a newly invented receiving apparatus claimed to be much in advance of any of those in use. He was having a pleasant chat with a steamer a couple of thousand miles away when suddenly the circuit was interrupted by frantic calls of "NY!" "NY!" "NY!" followed by the signal "M." No response came and the calls were repeated. After listening a short time the operator broke the circuit and asked: "Who is calling?" Instantly came the response: "Do you hear me? Who are you? This is the planet Mars, answer." When assured that he had at last succeeded in being heard, the distant planetary operator said: "Now hear what I say. For the love of 'Great Mars' don't lose me, don't lose me. Gee! but you're slow down there. Mars was working wireless to Saturn before Morse was known. I have been calling you for years and had given up all hopes of ever making you hear me. Remember me to all of the boys; all of the old-timers know me. I am Hank Cowan. Forty years ago I worked all over the United States. Just wait a minute and I'll cut you through to Jupiter "Ju." and 'Joe' Barley will tell you all about ballooning from Mars, and many other things that will interest you. In the meantime I'll run over to 'Sandy' Spencer's. He has a new joint on Planet Lane and this is opening night. There's Mercury after me on the aerophone. Amos Learned has offered a big prize for the first connection with the Earth for an item for his papers. Call 'Ju' now and I'll see you later."

The message concluded, silence once more reigned, and distant Mars could be observed still glowing in the heavens, yet with a perceptible enlargement of sphere and warmth of color. A closer inspection seemed to reveal even a faint twinkle, significant because in contradistinction to the ordinary stolidity and calm of planetary dignity.

Book Review.

"Creation," an epic poem, by Arthur H. Crain, an operator, a son of Colonel M. D. Crain, night manager of the Western Union Telegraph Company, St. Louis, is a production founded on the Book of Genesis. In four parts, or books, it introduces Adam and Eve in the Garden of Eden; the temptation by Satan is portrayed, the fall of the couple and their expulsion from Paradise is told; the consequent wickedness, sorrow and misery that followed throughout the earth because of the first transgression is depicted, with a culmination finally pictured in the flood which drowned the world, thus closing the first era of human and animal existence save those who escaped in the ark.

"Submarine Telegraphy" is the title of a book issued in pamphlet form, which, although not of recent date, nevertheless supplies a fund of general information on the subject of such a character as to render the work always one of interest and practical value. How full this volume of sixty-four pages and of abundant illustration, treats its subject matter, may be judged from a contemplation of its table of contents which includes the following references: The number of cables; action of cable; means adopted to counteract discharge; principle of mirror galvanometer; connections of cable apparatus; minnotto cell; the syphon recorder of Curtiss; the transmitters of Cuttriss and Wilmot; tests for faults in cables; condensers—description of their quantity and capacity, laws of measurement of capacity and connections of condensers in series and quantity; explanation of the terms tangent; constant of galvanometer; range and divisions of tangent; the controlling magnet; the effect of iron in the coil, or near the galvanometer; direction of lines of force round the coil; the tangent law; the measurement of current and resistance simultaneously; additional Wheatstone bridge tests; loop test for earth when the wires are of unequal resistance; test for distance of a contact; Varley's and Murray's methods; theory of the Wheatstone bridge—comparison with the differential galvanometer; analogy of water pipes; effect of increasing the width of the pipes; description of theoretical diagrams of the bridge; effect of changing the resistance in the arms; proof that the resistance of any arm is equal to the product of the resistances of the adjacent arms divided by that of the fourth arm; formulae for calculating the currents in the arms; resistance to employ in the arms.

The price of this book is seventy-five cents. It will be sent to any point on receipt of price. Address J. B. Taltavall, Telegraph Age, 253 Broadway, New York.

Orders, if sent to Telegraph Age, Book Department, for any book required on telegraphy, wireless telegraphy, telephony, electrical subjects, or for any cable code books, will be filled on the day of receipt.

Retirement of General Greely.

Major General Adolphus W. Greely, United States army, and until between two and three years ago chief signal officer, was placed on the retired list on March 27, that distinguished officer having reached the constitutional age limit of sixty-four years on that date.

Few if any officers of the United States army have enjoyed such a wide measure of fame during recent years as has Gen. Greely. It is now something more than a quarter of a century ago that he attracted world-wide attention by a Polar expedition, of which he was the chief. This expedition sailed northward in 1881. It contained twenty-five members, of whom only seven came back.

Two relief expeditions failed to find the Greely party, and when finally rescued by the third expedition, sent under command of Capt. Winfield S. Schley, the survivors of the party were nearly crazed with hunger. At the time he made this expedition to the Polar seas Gen. Greely was a lieutenant in the Fifth Cavalry. The expedition reached a point further north than any previous record.

Before going to the Arctic, Lieut. Greely had built thousands of miles of military telegraph lines in Texas and the Southwest and had acted as an officer of the Signal Corps, then commanded by Brig.-Gen. Albert J. Myer. The latter organized the corps, which was afterward commanded by Brig.-Gen. W. B. Hazen, and later, following the death of Gen. Hazen, in 1886, by the returned Arctic hero, who had been made a captain in the regular course of regimental promotions in the Fifth Cavalry.

During and after the Spanish war Gen. Greely had a further opportunity to show his great ability as a builder of telegraph lines. Under his immediate direction there were built and operated 1,000 miles in Porto Rico, 3,800 miles in Cuba, 250 miles in China during the Boxer outbreak, and 10,500 miles of lines and cables in the Philippines. He afterward installed a system of 3,900 miles of telegraph lines in Alaska, one of these lines being the first wireless system to be put to commercial use.

One of Gen. Greely's most brilliant achievements was the reorganization on its present efficient basis of the National Weather Bureau. Previous to his incumbency the service was of a most crude and untrustworthy character. He began at once to gather meteorological data from every reliable source, and in the course of time he was able to arrive at something definite. He established a complete system of weather stations in various parts of the country and lifted the service from the plane of ridicule to that of respectability.

General Greely is a native of Newburyport, Mass., where he was born March 27, 1844. He enlisted as a private soldier in 1861, shortly after the breaking out of the Civil War, when but seventeen years of age.

"A Practical Remedy for Neutralizing the Effect of Induction in Telegraph Apparatus."

BY J. F. SLACK, OF BEAUMONT, TEXAS.

I noticed in the April first issue of Telegraph Age, under the heading which I place at the top of this contribution, and which was discussed under the general title of "Some Points in Electricity," a subject which appealed to me very forcibly. As the article seemed to be open for discussion, I herewith offer my experience along just such lines as those described.

After taking charge here as division wire chief, of the Santa Fe system, I found that for several years the wires had been badly interrupted at times by what was commonly termed with the operators and despatchers of this division, a cross, but after investigating for myself, I decided that the trouble was induction. I immediately set about to remedy the evil by first ascertaining the cause, which I found to be a high voltage electric light current paralleling our wires for a distance of one hundred and fifty feet from the street to the transformer outside the building; this electric light wire is an alternating current and paralleled our wires within three to six inches. My remedy was immediately effective and without extra cost to the company.

The original telegraph line was on brackets, which I had removed, and the wires were placed on crossarms at a distance not closer than ten feet from the electric light lead. This clearly eliminated the trouble, and I have not been bothered since from that source. I note, however, that the distance Mr. Applegate claims for his circuit was something like thirty or forty miles, while mine was but a few feet, which was much easier to remedy.

The Old Time and Military Telegraphers' Reunion.

The annual reunion of the Old Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps, will meet this year at Niagara Falls, N. Y., on September 16, 17 and 18. This in reality will be the holding of the postponed meeting of 1907, deferred at that time because of the disturbed conditions in telegraph circles. Practically the same programme of entertainment determined upon last year, will be carried out this year, and headquarters will be established at the International-Cataract Hotel, as before designated.

The officers of the Old Time Telegraphers' and Historical Association are: Harvey D. Reynolds, president, Buffalo, N. Y.; George A. Burnett, Buffalo, N. Y.; I. McMichael, Toronto, Ont., and George F. Macdonald, Ottawa, Ont., vice-presidents; John Brant, secretary-treasurer, 195 Broadway, New York.

The officers of the Society of the United States Military Telegraph Corps are: Colonel William B. Wilson, Holmesburg, Philadelphia, president; William L. Ives, New York, vice-president; J. E. Pettit, Chicago, secretary and treasurer.

Letters From Our Agents.

ST. LOUIS, WESTERN UNION.

The St. Louis Barclay department is to have three more printers, one each with Denver, Omaha and Dallas. It is understood that considerable of the business from Denver and the West which has heretofore gone via Chicago, will be diverted to the St. Louis route.

Superintendent George J. Frankel and General Foreman George E. Sharp are now on a trip of inspection through Arkansas and Missouri.

Chief Operator W. F. Burton, of Nashville, Tenn., made a visit to this office April 3. He was much interested in the Barclay department.

E. L. Dougherty has been placed in charge of the Western Union force at the Globe-Democrat office.

G. W. Schmittgens has been appointed chief of the check force.

E. W. Parmelee, Jr., has been elected manager; D. J. Kelley, captain, and F. E. Patrick, treasurer, of the Western Union Baseball Association.

Charles W. Henry and Miss Mayme Delester Smith, formerly manager of the Western Union at Beardstown, Ill., were married at Jacksonville, April 2.

Among the new subscribers to Telegraph Age are: N. T. Petty, F. S. Rowe, W. A. Wilkerson, W. N. Manley, E. A. Kintz, O. R. Carson, Miss Mildred V. Brunkhorst, M. J. Cassidy, G. A. Riber and M. Tulley.

Everybody here reads the safe and sane Telegraph Age.

NEW YORK NEWS.

Mr. G. W. Hickey, the well-known old-time telegrapher, formerly manager of the Western Union Telegraph Company at Plattsburg, N. Y., and at one time in charge of the Government telegraph in Porto Rico, whose recent marriage was noticed in this column, has returned from a wedding trip South which was extended as far as Florida, and Havana, Cuba.

Miss Mamie G. Smith, employed as telegraph operator by E. and C. Randolph, brokers, New York City, died March 31.

Thomas E. Maddex, whose death was noticed in the April 1 issue, was General Robert E. Lee's operator during the last year of the Civil War, and stood by the side of the Confederate chieftain receiving and sending the last message before Lee surrendered to General Grant, at Appomattox, April 9, 1865. After the conclusion of the war Mr. Maddex worked as a telegrapher in various cities throughout the country until 1897, when he was stricken with paralysis at Washington, from the effects of which he never recovered.

Advertising will be accepted to appear in this column at the rate of three cents a word, estimating eight words to the line.

Wanted—Information as to whereabouts of Operator E. J. Hamilton. Address "S," care Telegraph Age, New York.

Will buy or sell, in one to ten-share lots, Western Union Telegraph Company and Mackay Companies, stocks. Remittances by New York draft or express money order are requested. Address "Stock Investment," care Telegraph Age, 253 Broadway, New York.

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No operator who has to use a hard key knob continuously should fail to possess one of these flexible rubber key caps, which fits snugly over the hard rubber key knob, forming an air cushion. This renders the touch smooth and the manipulation of the key much easier. Price, fifteen cents.

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Canadian Pacific Railway Co.'s Telegraph, E. M. Bender, purchasing agent, Montreal, Que.

Commercial Cable Co., Commercial Pacific Cable Co., German Atlantic Cable Co., W. D. Francis, purchasing agent, 14 Desbrosses St., New York.

Great North Western Telegraph Co. of Canada, Geo. D. Perry, purchasing agent, Toronto, Ont.

North American Telegraph Co., H. A. Tuttle, general manager and purchasing agent, Minneapolis, Minn.

Postal Telegraph-Cable Co., Executive Offices, 253 Broadway, New York; purchasing agent, W. D. Francis, 14 Desbrosses St., New York.

Postal Telegraph-Cable Co. of Texas, S. M. English, general manager and purchasing agent, Dallas, Tex.

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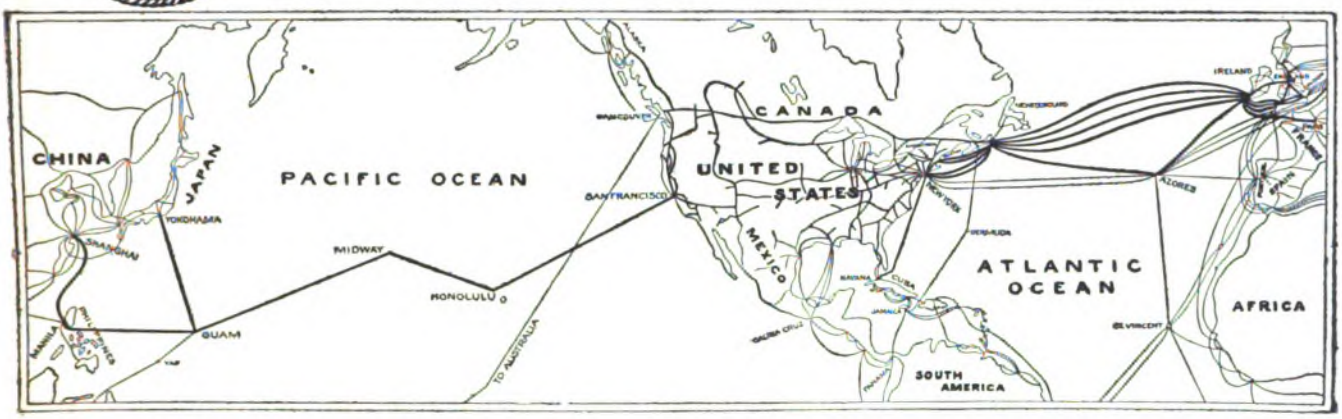

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