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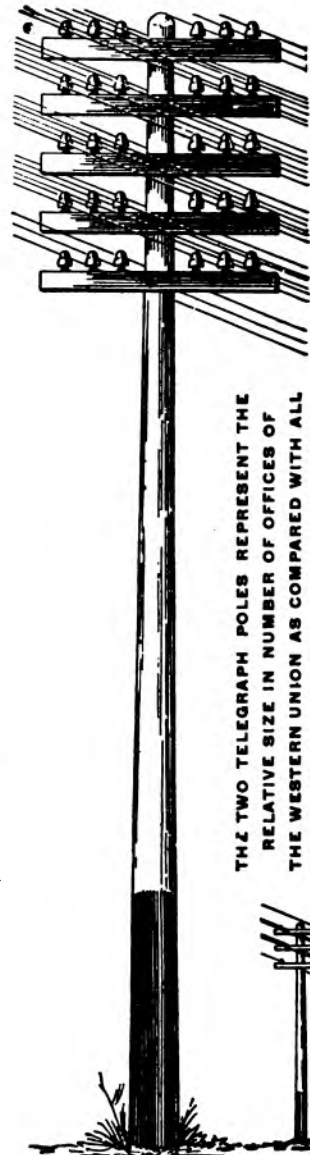
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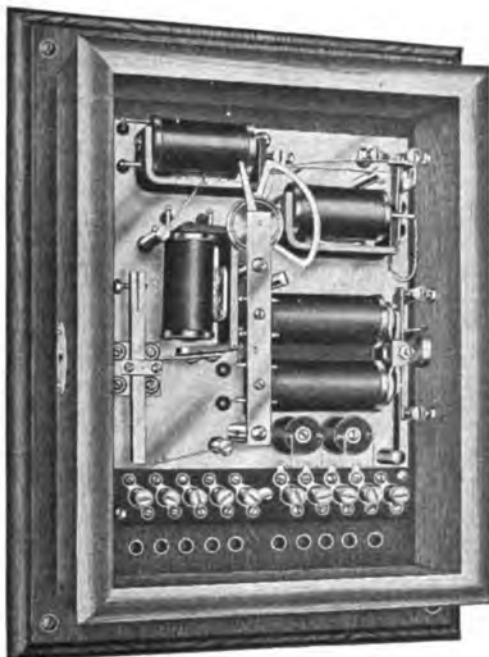
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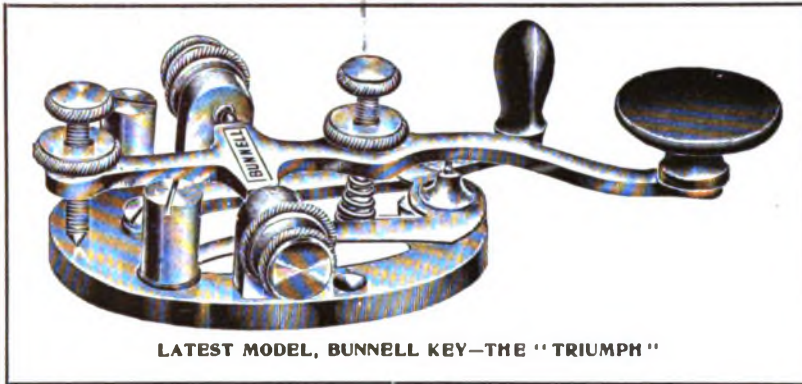
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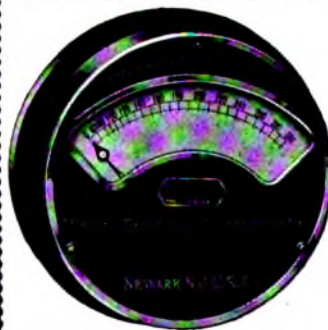
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TELEGRAPH AGE

No. 7.

NEW YORK, APRIL 1, 1909.

Twenty-sixth Year.

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SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Telephone.

PART I.

Now that the telephone is rapidly being installed in the stations of nearly all prominent railroads as well as in many commercial telegraph offices the up-to-date telegraph operator of the future must obviously possess a practical knowledge of both services.

The introduction of the telephone need not alarm the railroad or commercial operator in the least as a combination telegraph-telephone operator will always have preference over one who can handle the telephone only. Train despatching will probably soon be done entirely by telephone, therefore the telegrapher should at once begin the acquirement of such telephonic knowledge as will render his services indispensable to the railroad and commercial companies. He should look upon the additional work, not as weakening, but as strengthening his prestige by increasing the importance and responsibility of his profession.

By special request of many of those who wish to learn about the telephone and its use in con-

nection with this class of work, we will, commencing with this issue, take up the study of the telephone and its operation from the beginning, endeavoring to impart such information concerning its construction, connections and practical operation as may be helpful to those who desire to learn of this new adaptation for railroad requirements.

First, what is a telephone? The original telephone receiver is the human ear, consisting of the essential diaphragm operated by means of vibrating air waves agitated and characterized by the manipulations of the speaker's tongue and lips at a permissible distance from the one who listens.

All commercial telephones are merely mechanical devices for imitating this operation, their essential feature being a diaphragm which, in addition to acting in the capacity of a receiver, also performs the work of the speaker's tongue, or other wave agitator, by setting up a new set of air waves at a distant point which are an exact duplicate of the original waves in every particular except as to intensity. The ear diaphragm of the person who listens is impressed by the reproduced waves just as satisfactorily and effectively as though it received the original impulses.

The simplest way to illustrate the mechanical operation of a telephone is to observe the action which takes place in an ordinary toy telephone, such as children use, consisting of two stretched parchment disks connected together by means of a long, tightly drawn string.

In this case the air waves set in motion by the speaker's voice cause the parchment diaphragm at his end of the string to vibrate in a manner exactly corresponding with the calibre, timbre, and other characteristics of his voice. The diaphragm thus impressed in turn causes similar variations to occur in the tension of the connecting string, and thus causes the distant parchment diaphragm to vibrate in perfect unison with its companion. The result is that an entirely new and different set of air waves which are created by the terminal vibrating diaphragm reaches the ear of the listener. The person who listens, therefore, does not actually hear the speaker's voice in the sense of a direct impression, but gets a very faithful reproduction thereof, which answers the same purpose.

Now the modern telephone in commercial use to-day operates in exactly the same way, the difference in the outfit being merely that of construction, manner of arranging circuits, and the employment of such accessories in conjunction with an electric current as may be required to insure a greater efficiency both as to distance and accuracy of delivery.

THE ELECTRICALLY OPERATED TELEPHONE.

Obviously the tight string method limits the distance to which conversation may be exchanged to too narrow an area to be of much practical value. In order to overcome this defect the electric current was substituted for the variable

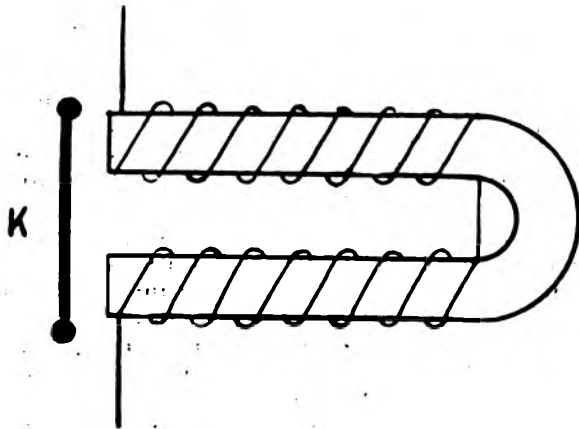


FIGURE 1.

string tension factor, and a metal wire instead of a string is used to carry the current. The student will readily see by a glance at the construction of a telephone, as shown in the accompanying diagram, and from the explanation of the principle upon which it operates which follows, how simply the change from the old to the present method was made possible.

If we take an ordinary horseshoe-shaped steel

disk capable of being easily vibrated is placed close to the pole-pieces as an armature and mouth-piece. Hence, when this metal disk is caused to rapidly approach and recede from the pole-pieces of the magnet when vibrated by the air waves set in motion by the speaker's voice, an induced current varying in volume corresponding in degree with the strength and characteristics of the voice-created air waves will flow through such coil if the latter be closed. In a telephone this coil forms part of the line wire and is connected in series with a similar telephone at the other end of the circuit, as shown in the accompanying diagram, Figure 2.

OPERATION.

When the speaker at one end of the circuit vibrates the metal diaphragm by means of his voice, he causes his telephone to act in the capacity of a very small dynamo, in the coils of which a current is generated, and which coils constitute part of the line circuit. The telephone coils at the distant point also being in the same circuit this current causes those coils to act in the capacity of a motor, which controls its armature or diaphragm, instead of acting in the capacity of a dynamo. As the same strength and characteristics of current simultaneously flow through both telephones, it follows that each impulse the speaker's voice impresses upon the diaphragm at his end will be duplicated by the diaphragm at the distant end vibrating in unison with that of the speaker and thus create a new set of air waves.

(To be continued.)

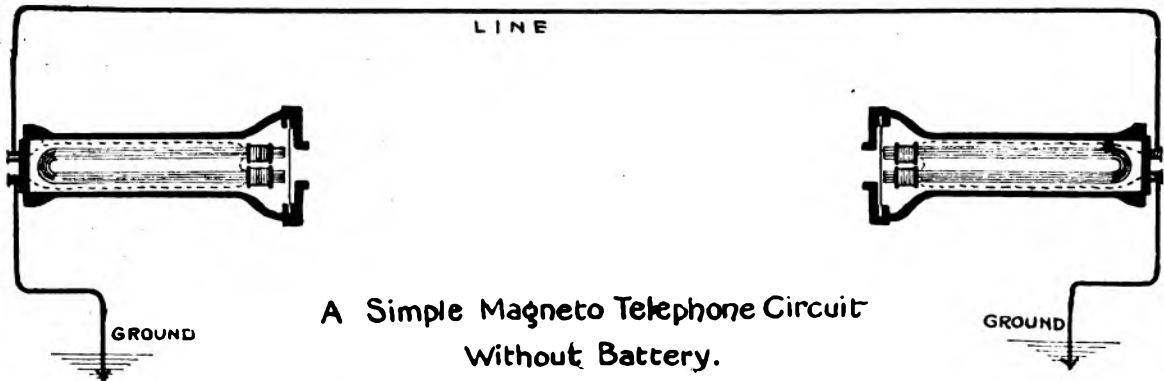


FIGURE 2.

magnet and wind a coil of insulated wire around it, as shown in Figure 1, there will be no current or other electrical effect created in such coil as long as the armature, K, remains quiet, but the moment the latter either approaches or recedes from the pole-pieces of the magnet, the resulting alternations in the magnetic strength of the steel core which follow cause an induced current of electricity to flow through the coil, the strength of which current at any given moment depends upon the relative proximity of the armature to the pole-pieces at that instant.

In a telephone the steel core, permanently magnetized, is wound in this manner, and a thin metal

Recent Telegraph Patents.

A patent, No. 913,718, for a system of space telegraphy, has been granted to L. De Forest, of New York, N. Y. It provides simple, harmonic impulses for tuning circuits to a spark frequency by connecting the aerial to a source of practically continuous oscillations of a frequency higher than the limit of audibility and at the same time providing a variable resistance in the earth connector with means for harmonically varying the same as by a tuning fork.

A patent, No. 914,342, for a storage battery, has been issued to Thomas A. Edison, of Orange, N. J., assignor to Edison Storage Battery Company, West Orange, N. J. Combined with two sets of grids

carrying pockets containing active materials are vertical separator rods of insulating material situated between the grids, each rod engaging four adjacent pockets.

A patent, No. 914,343, for a process of making storage-battery electrodes, has been awarded to Thomas A. Edison, of Orange, N. J. Consists in coating granular material with conducting metallic films, compressing the mass to secure coherence and in subjecting the films to a welding temperature in a hydrogen atmosphere.

A patent, No. 914,499, for an electricity rectifier, has been taken out by T. J. Murphy, of Rochester, N. Y. Changes alternating to direct current by utilizing an electric arc which provides a gap normally impassable to the current and permits the current to flow across the gap at definite points in its wave.

A patent, No. 914,713, for a multiplex telegraph system, has been secured by T. Giara, of Boston, Mass. Particularly for wireless telegraphy by means of which some of the impulses are sent over a conductor to one station and others through the air to another station. Uses several harmonic currents, whose impulses are sent simultaneously and received separately.

A patent, No. 914,837, for a line support, has been granted to John D. Hilliard, of Albany, N. Y. A tie wire on an insulator has a clamp securing its free ends and the conductor in parallel relation in the same plane.

A patent, No. 914,877, for a telegraph repeater, has been issued to G. L. Rawdon, of Cleveland, Ohio. Eliminates a number of the parts, including two local circuits and batteries, shown in patent No. 470,178. Provides a pair of main receiving relays, each having a main magnet and a differential magnet and means whereby the armature of one relay controls directly one coil of the differential magnet of the opposite relay.

The following patents have expired:

Patent No. 470,557, for a telegraph relay, held by C. M. Dyer, Cloverdale, Ind.

Patent No. 470,666, for police and fire-alarm signaling apparatus, held by L. B. Firman, Chicago, Ill.

Patent No. 470,677, for combined police and fire-alarm signal apparatus, held by L. B. Firman, Chicago, Ill.

Patent, No. 470,768, for a printing telegraph, held by E. J. Silkman, Baltimore, Md.

Personal.

Mr. Walter P. Phillips, previous to 1897, and for many years, general manager of The Associated and The United Press, New York, but for the past few years identified with the Columbia Phonograph Company, and now residing at Bridgeport, Conn., was a recent New York visitor, and while in the city took occasion to call on many personal friends.

Miss Alice Pettit and H. E. Pettit, through Colonel William R. Plum, historian of the mili-

tary telegraphers, have thanked the members of the Society of the United States Military Telegraph Corps for the beautiful floral piece, representing the United States flag, sent as a tribute at the death of their father, James E. Pettit, of Chicago, who was secretary of the society for twenty-seven years.

Mr. Milton F. Adams, an old-time telegrapher, who has the distinction of having introduced Thomas A. Edison to the scientific world at Boston in the middle sixties, and who has been identified with various electrical and commercial enterprises for the past quarter of a century, is visiting the city to interest capitalists in the lately discovered diamond mines in Arkansas, where he has been a resident for the past year.

Major J. Orton Kerbey, of Washington, D. C., on March 10 delivered two lectures in Johnstown, Pa., on the "Land of To-Morrow." Major Kerbey, who is an old time and a military telegrapher, was United States consul for several years in one of the South American republics, and is one of the few men in this country who realize the importance of the commerce that awaits the business men of the United States in that part of the American continent. The Major has devoted the past fifteen years of his life impressing upon the people of this country the development that is taking place in the Central and South American republics, and his book, "The Land of To-Morrow," is an interesting work, recording, as it does, the author's views of these wonderful countries.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Mr. Thomas F. Clark, vice-president of the company, who has been absent from his office for the past three months because of an attack of typhoid fever, is reported to be very much improved, and it is thought will be able to resume his official duties in the near future.

Mr. J. E. Jenkins, inspector of the company, with headquarters at New Haven, Conn., was a recent New York visitor, and took occasion while in the city to make calls on many of his personal friends.

At the annual meeting of the stockholders of the Marine and Inland Telegraph Company, held at Jersey City, N. J., on March 1, Robert C. Clowry was elected president; G. W. E. Atkins, Thomas F. Clark, J. B. Van Every, J. B. Bertholf, E. M. Mulford and B. Brooks, directors. At the same time and place the following were elected officers of the New Jersey and New England Telegraph Company: Robert C. Clowry, president; G. W. E. Atkins, J. C. Barclay, J. B. Bertholf, B. Brooks, Thomas F. Clark, George H. Fearons, E. M. Mulford and J. B. Van Every, directors.

Mr. Herbert Smith, of New York, assistant superintendent of the company, who was accompanied by his daughter on a two-months' visit to England, has resumed his duties.

Miss Helen Roehm, daughter of George Roehm,

of the office of General Superintendent Belvidere Brooks, has been presented by the New York Times with a Tiffany medal for merit in an essay on Abraham Lincoln.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

Mr. Charles P. Bruch, vice-president of the company, who has been confined to his home with typhoid fever for several weeks past, is reported as convalescing.

Mr. E. B. Pillsbury, general superintendent of the eastern division, will, on May 1, occupy a new suite of offices on the ninth floor, which will be adequate to meet all requirements. The offices of Mr. Leona Lemon, division superintendent, and Mr. E. Kimmey, district superintendent, will be included in the space allotted to the eastern division.

The marine department, which has been located on the tenth floor for many years past, has been moved to the operating room on the twelfth floor.

Mr. Morris Ruberg, of the Rowland department of the Philadelphia office of this company, was a recent New York visitor.

The Cable.

The length of the Mozambique-Beira cable recently laid is 988 kilometres, and of the T-piece to Quelimane 113 kilometres, while the length of the Beira-Lourenco Marques cable is 1,070 kilometres.

Cable communication is interrupted March 29 with:

VenezuelaJan. 12, 1906
Maduro Island (Dutch East Indies) ..Feb. 3, 1908
MacaoAug. 29, 1908

Messages can be mailed from Hongkong.

In overhauling the seven submarine cables between Italy and Sicily after the earthquake it was found that some were badly damaged by heat, the sheathing and layers of rubber being burned and in some cases the copper conductors were fused. One of the cables was so deeply embedded in the bottom of the sea, owing to a change in the floor of the strait of Messina, that it had to be abandoned.

The first report of the directors of the Deutsch-Sudamerikanische Telegraphen Gesellschaft, of Cologne, states that the company was formed on August 27, 1908, for the purpose, in the first place, of establishing and working a cable connection between Borkum, via Santa Cruz de Teneriffe to Brazil. The negotiations as to whether the cable shall be laid direct from Santa Cruz de Teneriffe to Pernambuco, or via Monrovia, are still proceeding. It is proposed later on to extend the cable from Teneriffe or Monrovia to the German Colonies on the west coast of Africa, so as to connect Togo, the Cameroons and German South-West Africa. The share capital for the first section from Borkum to Teneriffe amounts to £200,-

000, apart from a loan of £390,000, while the capital required for the remaining sections will be provided by an increase in the ordinary shares and a further issue of bonds. The requisite concessions for the landing of the cables were originally acquired by the Felten & Guilleaume-Lahmeyer Works Company, and were transferred to the German South American Telegraph Company. An obligation has been entered into by the German government to pay subsidies for the various sections for a period of forty years, but seventy-five per cent. of the cable receipts during this term will be reckoned on account of the subsidies. The payment of interest and redemption of the loan of £390,000 has been guaranteed by an agreement concluded between the German Imperial Post Office and the company.

The work of construction and laying of the cable to Brazil has been entrusted to the North German Sea Cable Works Company, of Nordenheim, which has undertaken to take over on account of the contract the four and one-half per cent bonds to be issued by the company on conditions arranged for, while the balance will be paid in cash. The speed of transmission with the recorder system is to amount to a minimum of twenty-four to twenty-five words per minute, each word being reckoned as composed of five letters, and in this way the cables will be assured of being able to deal with the traffic that is expected. At the end of 1908, seven hundred and ten nautical miles of the Borkum-Teneriffe cable were completed, and the work of laying to Teneriffe will presumably be finished in July. The working of the cable from Germany will be undertaken by the Imperial telegraph administration from Emden, and the necessary cable connection between Emden and Borkum has already been effected by the administration.—Electrical Review, London.

The Central and South American Telegraph Company's annual report for the fiscal year ended December 31 last, issued March 25, is as follows, in comparison with the previous year:

	1908.	Changes.
Gross receipts	\$1,664,506	Dec. \$84,538
Operating expenses.. . . .	648,643	Inc. 91,978
Net income	\$1,015,863	Dec. \$176,516
Repairs and rentals	84,559	Inc. 51,146
Depn. investments, bonds.. . . .	25,925	Inc. 25,925
Total.. . . .	\$110,484	Inc. \$77,071
Balance	\$905,379	Dec. \$253,587
Dividends	574,260	Inc. 23,229
Balance	\$331,119	Dec. \$276,816
Mex. Govt. participation	2,592	Inc. 2,592
Surplus	\$328,527	Dec. \$279,408
Previous surplus	1,019,819	Inc. 607,935
Profit and Loss surplus	\$1,348,346	Inc. \$328,527

The Mexican Telegraph Company's annual report for the fiscal year ended Dec. 31 last is as follows, in comparison with the previous year:

	1908.	Changes.
Gross receipts	\$811,342	Dec. \$236,189
Operating expenses	153,750	Inc. 20,065
Net earnings	\$657,592	Dec. \$256,254
Charges	45,970	Dec. 2,508
Balance	\$611,622	Dec. \$253,746
Dividends	287,010	Dec. 90
Surplus	\$324,612	Dec. \$253,656
Previous surplus	2,381,895	Inc. 578,268
Profit and Loss surplus	\$2,706,507	Inc. \$324,612

Robert C. Clowry, president of the Western Union Telegraph Company, New York, a few days ago issued a statement in reply to an inquiry, saying that he had read the published statement of Mr. C. H. Mackay, the president of the Commercial Cable Company, to the effect that they have completed arrangements to route one of their cables via Newfoundland. In the Western Union cable system, he said, four cables have been operated from Newfoundland, two from Cape Canso, N. S., and one from Halifax, N. S., to England since 1882. There are also two cables operated from New York to Cape Canso, in addition to the land lines connecting with all of these cables. It appears therefore that the Commercial Cable Company now proposes to do what the Western Union has been doing since 1882.

Obituary.

Joseph S. Swan died at his home in Brooklyn, March 23, aged sixty-seven years. Mr. Swan was for over forty years representative of the Associated Press, at the ships news office, New York.

Willis J. Rodman, superintendent of telephones and telegraphs of the Panama Railroad, died at Colon, Panama, February 28. Mr. Rodman went to the Isthmus from Chicago, where he was well known in telegraph and railroad circles, in 1905.

John Murray, a veteran telegrapher of Montreal, died in that city, March 11. Mr. Murray went to Canada in 1854, and was formerly manager of the old City and District Telegraph Company of Montreal. He also had the distinction of starting the first telephone circuit ever operated in the Dominion, which was in 1879. Some years ago he published a book entitled, "A Story of the Telegraph," which was very favorably received by the telegraph and cable fraternity.

P. W. Snider, superintendent of the Canadian Pacific Railway telegraph system at St. John, N. B., and one of the best known and most popular officials in the service of that company, died on March 22. The announcement of his death came as a shock to his friends in the Dominion as well as in the United States. The affection in which Mr. Snider was held is best evidenced by the statement that the floral contributions as well as telegrams of condolence were sent from many points both in Canada and the United States.

Mr. Snider was born in the county of Halton,

Ont., in July, 1854. His telegraphic career began in the employ of the Dominion Telegraph Company at St. Catharines, Ont., in 1870, subsequently serving the same interests at various points in the Province of Ontario, and in the Parliament Buildings at Ottawa. In 1877, when his company extended their lines to the maritime provinces, Mr. Snider was selected for the management of the St. John, N. B., office. The year following he was further advanced to the position of section manager for the maritime province district, holding the same until 1881, when consolidation with the Western Union Telegraph Company being effected, he was appointed cashier of the St. John office. When the Canadian Pacific Railway Telegraphs extended its system to the Atlantic coast, and established an office at St. John, in January, 1889, Mr. Snider became its manager. In 1890, on the completion of the company's lines to Halifax and Canso, he was made circuit manager, being placed in charge of the maintenance of lines in the maritime provinces. On November 1, 1903, he was promoted to the superintendency of the Atlantic division of the system, which position he held at the time of his death.

Mr. Snider, accompanied by his wife, occasionally attended the reunions of the Old Time Telegraphers and Historical Association of which he was a member, and was present at the Niagara Falls meeting last September.

The Annual Report of the American Telephone and Telegraph Company.

The annual report of the American Telephone and Telegraph Company made public March 23 shows a substantial gain in earnings over the previous fiscal year. During 1908 the dividends received on the stock of its subsidiary companies totaled \$13,280,127, against \$11,805,166 in the previous year. Total earnings amounted to \$27,808,970, against \$25,600,671. Expenses dropped from \$2,130,381 to \$2,003,956, leaving net earnings of \$25,805,013. The payment of \$12,459,156 in dividends and interest, amounting to \$7,773,306, left a surplus of \$5,662,551.

During the year \$39,736,700 were applied out of revenue to maintenance and reconstruction purposes.

The total amount of maintenance and reconstruction charged against revenue for the last six years was over \$186,700,000.

The number of stations operated totaled 3,215,245, an increase of 179,712. The number of exchanges in the United States is 5,043. The mileage of wire increased by 1,220,126 miles, and now amounts to 9,830,718 miles. The total daily average of telephone connections during 1908 reached the enormous total of 18,063,000, or at the rate of about 6,106,000,000 per annum.

There are over 70,000 shareholders in the various companies constituting the Bell system, and nearly 100,000 employees.

French Telegraphers Go On Strike.

A general strike of telephone and telegraph operators occurred in France on March 12, and lasted until March 22. It began with a meeting of several hundred postmen held to protest against certain modifications in the service. They became unmanageable and marched to the telegraph bureau, which they stormed, and the operators on duty at the time joined the postmen. During the disorder that followed, telegraph instruments were damaged and windows broken.

The telegraphers then held a meeting and passed resolutions which said that the strike was a protest against arbitrary, tyrannical management, and their action was precipitated by under secretary Simyan, of the Posts and Telegraph Department, who had insulted the association's officers.

M. Simyan at once issued orders to the sub-chiefs to suspend every employe guilty of insubordination, and that military operators be held in readiness at Versailles to take the places of the strikers.

One of the leaders of the strike declared, when arrested and brought into court, that a system of tyranny existed in the telegraph and postal service, and that promotion now depended upon favoritism. He said men holding Socialist or Clerical opinions were kept down, and insisted that the real cause of the trouble was to be found in this injustice.

About forty telegraph operators, who were arrested for destroying property in the Paris central telegraph office, were fined and sentenced to prison for six days each.

When the operators then at work at the central office learned of these convictions they indulged in a violent manifestation. The police, who had been concealed in the basement of the building of the central office, rushed in to the operating department and made many additional arrests, including four of the leaders. All operators who refused to work were suspended and expelled from the building. There are over 4,000 operators employed in the Paris central office. Communication with outside points was maintained with difficulty and Paris had to reach London via New York. For several days messages were received in this city from Paris destined to London houses and many of the Paris newspapers secured their budget of Continental news from correspondents located in New York newspaper offices. With the exception of the United States, France for several days was entirely cut off from foreign communication. The strike became quite general throughout France, involving telegraph and telephone operators, linemen, postmen and mail sorters and employes in every branch of the French telegraph and postal service.

Fifteen wires are constantly required to carry the telegraphic traffic between London and Paris, all of which, with occasional exceptions, were at a standstill during the continuance of the trou-

ble. It would seem that the government officials were determined that the trade unions with which the members of the various branches of the telegraph and postal service were affiliated should not receive official recognition, while on the other hand the unions took every occasion to impress upon the officials their grievances, demands and the importance of their united strength. Many of those who took part in the beginning of the trouble later yielded before the attitude of the government, which threatened instant dismissal and loss of state servant privileges.

A leading Paris authority, in commenting on the trouble, said:

"Among the rights of government officials there is not and never can be the right to strike; that is to say, the right to hurt the entire country in order to bring about the triumph of claims which are at least open to debate.

"This principle was proclaimed in the Chamber of Deputies and sustained by an overwhelming majority. Without this principle there would be no government possible, and when, at a future date, the status of government servants shall be discussed the memory of the evil days which we are now passing through will preserve us from imprudent concessions. That is the lesson and that will be the benefit which we shall derive from this adventure."

Premier Clemenceau stated that the strike was senseless, entailing the gravest consequences, not only to the business of France, but to the country itself from an international point of view.

Though the delays to English and Continental business were very irritating and inconvenient, the quickness with which special messengers could be despatched from nearby cities outside of France to Paris, and vice versa, made the situation less grave than would otherwise have been the case.

The trouble was finally ended March 21 by the strike committee virtually suing for peace. The government, however, met the committee halfway by promising that in the future grievances could be laid directly before the Minister of Public Works. It appears that the new regulations formulated by M. Simyan provided that merit hereafter should be the basis of promotion instead of seniority as in the past.

The publication in the official journal of a long circular, addressed to M. Simyan and the postal chiefs, minutely instructing them as to the manner of applying the promotion system recently inaugurated is evidence of the fact that the government has no intention of abolishing the system, which is repugnant to the men. The circular states that the object is to remedy the widely varying methods employed in the selection of employes for promotion, which has caused most regrettable jealousies among the officials of the same grade.

The operators claim that where merit is the basis of promotion the doors are opened to favoritism.

The strike leaders had several conferences on March 22 with the ministers. Premier Clemenceau met a deputation, but though he said that the government would undertake a settlement in a conciliatory spirit, it must refuse to bind itself with promises. The deputation was particularly anxious for the reinstatement of MM. Grangier and Simonet, but the premier would not accede to this. These men were the ringleaders of the strike in 1906, when they indulged in most inflammatory and insulting speeches against the government. They were dismissed from the service on this account.

M. Barthou, Minister of Public Works, warned the committee that the government was prepared to dismiss irrevocably every striker who had not resumed work.

Meantime not less than 1,000 employes returned to their instruments. Early in the same day a meeting attended by 5,000 strikers decided that the recommendations of the strike committee in the matter of a settlement constituted a surrender to the government because the resignation of M. Simyan, Under Secretary of Posts and Telegraphs, had not been secured. As a result another committee was appointed, which conferred with Premier Clemenceau later in the day, when it was decided that all of the strikers should return to work without prejudice.

That the French operator, like his fellow-countrymen, can do nothing without a touch of the aesthetic was shown finally when the strike came to an end.

The strikers returned to work in procession, each member of which wore a boutonniere of mimosa. The postmen gallantly escorted the telephone girls to their bureaus, upon their entering which the waiting officers greeted them with cheers and kisses.

Premier Clemenceau, anticipating the return of the strikers, had relieved the soldiers from duty, and the prodigals resumed their places without further incident.

The lessons to be learned from the recent strike in France are manifold. This event has furnished an adverse illustration on what was, at least up to a few years ago, a stock argument, used by the advocates of governmental ownership of railroads and telegraphs. It was, in brief, that under government ownership there would be no more strikes.

The logical demonstration of this claim was never very clear. Most of the claimants seemed to base it on the idea that a Government position would be so desirable that no one would wish to strike. Back of that may have been the thought that a Government operating telegraphs would use its power to suppress any general strike, but that argument was not brought into prominence. This idea was salient in the public ownership advocacy. Its last and most famous manifestation was in that New York platform declaration at the time of the anthracite coal strike, on the basis

of which the platform called for Government ownership not only of railroads and telegraphs but of coal mines.

The telegraphers' strike in France leaves little foundation for the assertion that under Government ownership strikes would be impossible. The claim was always dogmatic and without reasonable foundation. The right of men to quit working for the Government is as indisputable as their right to quit working for a private employer.

In the case of a strike on a privately owned railroad or telegraph line the simple duty of the Government is to preserve order and give the contesting parties a chance to win if they can or come to some compromise agreement if they choose. But in case the strike, as in France, is in some state-owned and operated business the Government must be at once a direct party to the controversy and the preserver of law and order between itself and its antagonist. That doubles the scope of its task and more than doubles its difficulty. Premier Clemenceau in failing to successfully fight the strikers practically confessed that the government is at the mercy of its employes whenever they may walk out in combination, on account of real or fancied grievances. On the other hand, however, the French government cannot, in harmony with the constitutional principles upon which the republic of France is organized, use compulsion with its civil service employes; they are just as much at liberty to strike against the government as they would be to strike against a private firm. The occurrence of this strike will serve to direct general attention to this very weak spot in the socialistic or state ownership scheme of government. Every government that takes over public utilities like railroads or telegraphs must sooner or later, it appears, confront the question whether it will consent to be placed in the same status as private employers in dealing with strikers. There have been experiences in Australia and Italy wherein the governments by forceful means demonstrated their power over striking employes; indeed, strikers ordinarily can have little chance of victory over a government determined to sustain its position and to respect its obligation to the people as a whole in operating these vitally essential public services without serious interruption. But the attempt to force men to work by military or police measures can easily assume so obnoxious an aspect that suppressive action is extremely delicate and may become dangerous.

More than a quarter of a century ago Herbert Spencer, in a published paper entitled "The Coming Slavery," urged that government upon the socialistic plan must be conducted as a military despotism. Under a system where all forms of business are conducted by the government he pointed out that the management would be subjected to the continual whims and caprices of the constituency, who would, at the same time, be the governmental employes, and that the situation would thus be chaotic. He argued that to avoid con-

tinual disorganization from dissensions the officials of a socialistic system of government must use the military forces at its command to enforce discipline and order. The situation at the French capital seems to an extent to illustrate the Spencerian theory. It also seems to substantiate the wisdom of the Rooseveltian doctrine that government supervision is much to be preferred to government ownership.

The detailed history of the crisis is no less striking than the remedies proposed for extrication. One authority blames the socialistic tendency of the chamber of deputies for having encouraged the formation of more than thirty associations of state employes, thus creating a sort of administration inside the administration. It favors a law prohibiting public employes from going on strike, at the same time giving them guarantees against political favoritism, and does not hesitate to say that success of strikers means a government by trades unions.

The truth is, of course, that the formation of trades unions or similar organizations ought not to be permitted in the government service. Combinations of public employes for such purposes as mutual benefit of a social or economical nature may be unobjectionable, but combination for the purpose of fighting and coercing the employing government is intolerable. It makes impossible an orderly and efficient administration for the public good. Everyone can see that in the case of the army and navy, in which such organizations could not be tolerated for a moment. But it is said that it is impossible to prevent the formation of such organizations in the civil service; and if that is so then the fact is a strong argument against state ownership of public utilities. What has happened in France is, then, in the nature of a warning against turning over our American railroads and telegraphs to the ownership and operation of the government.

Milliammeter Readings.

My query in regard to milliammeters, which was answered in the March 16 issue of Telegraph Age, was followed a few days later by a letter in which I stated that I had discovered the cause of the variation in their readings, but that it would be well to publish the explanation for the benefit of those who might notice a similar variation in milliammeter readings.

The cause of the variation in my instruments was that one of them was a real milliammeter of low resistance, while the other was a voltmeter of high resistance, but having a 100-ohm shunt and calibrated to be read as a milliammeter. The addition of the 100 ohms resistance in this instrument causes but little variation with the other form of instrument when used in circuits of high resistance, but when used in a circuit of low resistance its extra 100 ohms causes a wide variation in its reading as compared with the low resistance milliammeter. A resistance of 100 ohms would have to be inserted in series

with the latter instrument in order to make the two read alike.

The shunted voltmeter type of milliammeter has come into extensive use during the past two or three years, chiefly for test board work in testing the current on Morse leased wires, etc. It is, of course, accurate for short circuits, reading the correct current while it is in the circuit, but when withdrawn the 100 ohms it contains is also withdrawn and the current in the circuit rises accordingly.

D. B. Grandy.

St. Louis, Mo., March 18, 1909.

The Late Otis E. Wood.

Mr. J. E. Dunning, of Paterson, N. J., the well-known old-time telegrapher, who has been in other business for over forty years, but who has never lost interest in his early telegraph connections, has this to say regarding the late Otis E. Wood, whom, it is stated by many, was among the very first telegraphers to receive by sound. He writes:

"In 1852 while I was in the Utica, N. Y., office, having learned there in 1851-2, Mr. Wood stood over me one day while I was reading from the paper tape. Coming to a broken place I was about to say --- when he placed his hand over mine on the key and read past the break by sound. This was the first sound reading to my knowledge. This was after he had been appointed superintendent of the New York, Albany and Buffalo Telegraph Company for the second time."

Many interesting stories are told concerning the early career of Mr. Wood. Reid's "History of the Telegraph" relates in the chapter devoted to the progress of telegraphy that in 1854, when a movement to change the Morse alphabet was started, the object being to eliminate the spaced letters, and the New York, Albany and Buffalo Telegraph Company endorsed the changes, Mr. Wood threatened to resign the superintendency if the order was enforced. The order was immediately revoked, with the result that the alphabet remains to-day as first arranged by Professor Morse.

It might be remarked that the contemplated changes were carried out in foreign countries, thus establishing what is now known as the universal telegraph alphabet. This alphabet is in use in every country in the world except the United States and Canada.

The Electrical World prints the following abstract from a German publication: At present only paper cables with air insulation are used in France for underground telegraph work. The copper conductors have from 1 millimeter to 2.5 millimeters diameter, in exceptional cases up to 5 millimeters; capacity from 0.06 microfarad to 0.08 microfarad per kilometer; 56, 112, 224 pairs of conductors; compressed air—2 atmospheres—is used for drying. To protect the lead covers of the cables against the stray currents from the tracks and return circuits of electric railroads, the lead cover is painted with a mixture of resin and other insulating materials.

New Postal Office at Birmingham.

The Postal Telegraph-Cable Company, at Birmingham, Ala., on March 27 moved into the new office which has been undergoing equipment for some time past. The structure known as the Brown-Marx building is sixteen stories in height, and is one of the finest office buildings in the south. It contains eight hundred rooms, and is up-to-date in every respect, including an all-night elevator service. This new office takes rank among the best equipped and most modern in the telegraph service. Its location and plans were personally supervised by E. J. Nally, vice-president and general manager of the company.



THE BROWN-MARX BUILDING,
The new home of the Postal Telegraph-Cable Company,
Birmingham, Ala.

The operating department of the Postal Company occupies nearly two thousand square feet of entirely unbroken floor space on the sixteenth story in the northeast wing of the building. This makes it one of the most elevated, if not the loftiest, operating room in the world. From its windows there is a magnificent and unobstructed view of the whole city and the surrounding mountains.

Being located on the top floor, it was found possible to terminate the supporting columns, which otherwise would have traversed it, at the floor below, and support the roof by large iron girders. This was done for the especial benefit of the telegraph company. There are no pipes or columns of any kind running up through this room. The lighting is nothing short of perfection. There are twenty-two windows, light being received from

all sides. The matter of lavatory, locker and lunch rooms for both male and female employees has been given the most careful study and these accommodations are as nearly perfect as it is possible to make them.

Directly across from the operating room are the offices of Superintendent Jesse Hargrave. These are likewise large, comfortable and well lighted.

The superintendent's office is connected with the operating room by pneumatic tube, to facilitate the business of that department; two tubes connect the business office with the operating department.

Nine motor-generators, six of the Sprague armored type and three of the Crocker-Wheeler make, conveniently located in a well-lighted space behind the main switchboard and cross-connecting frames, supply current to the quadruplex, du-

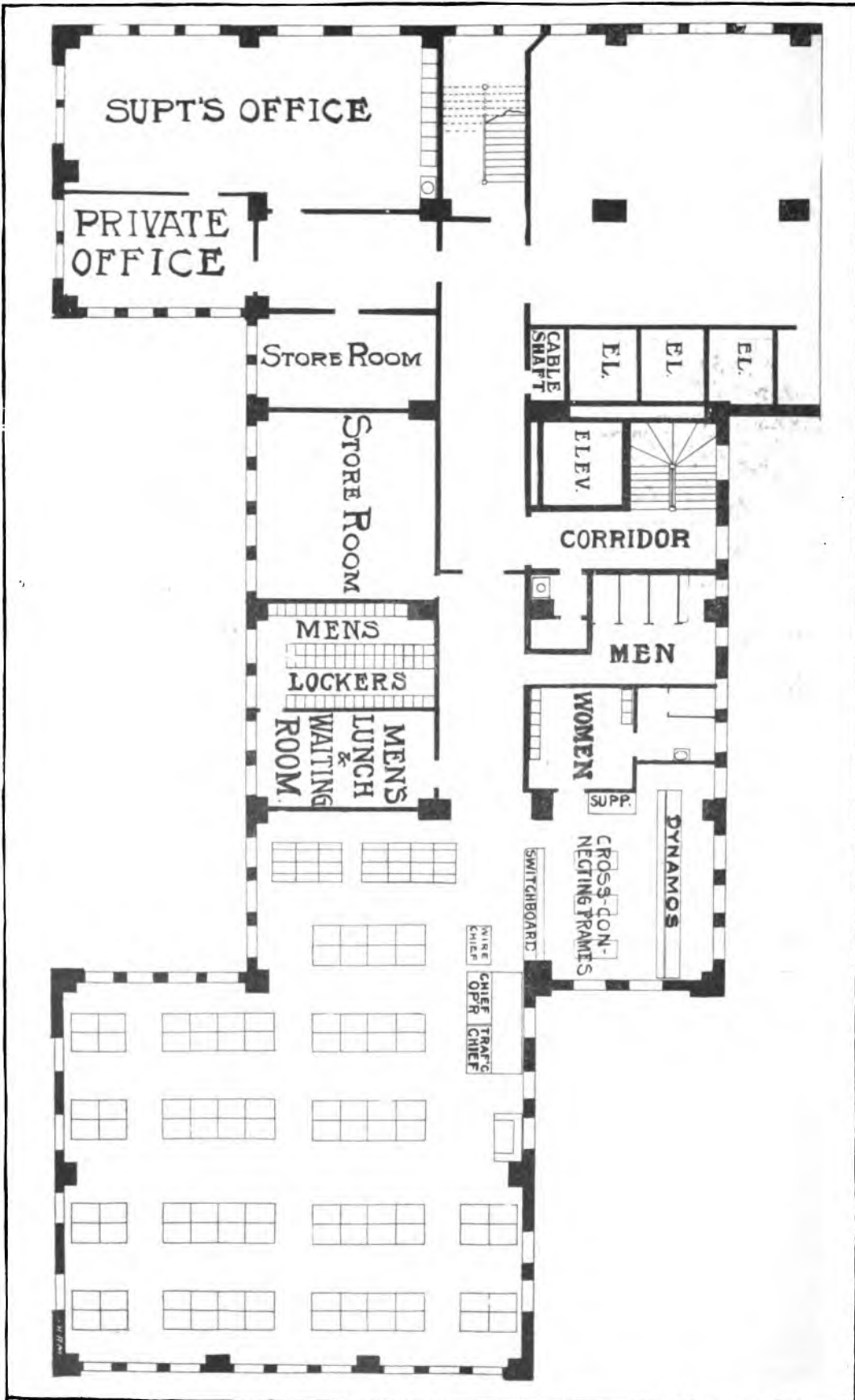


JESSE HARGRAVE,
Superintendent Postal Telegraph-Cable Company,
Birmingham, Ala.

plex and Morse circuits. Current for the locals is obtained direct from the power house of the Birmingham Railway, Light and Power Company over a 110-volt direct-current feeder. Duplicate leads over different routes are provided between the power house and office, a distance of four blocks, to insure against the possibility of interruption. All of the equipment, such as terminal frames, switchboards, operating tables, pneumatic tubes, etc., is of the latest and most improved type. This modern equipment undoubtedly makes this one of the most up-to-date telegraph offices in the world. The installation was made under the direction of the electrical engineer's office in New York and was supervised by Mr. J. P. Edwards, of Atlanta, Ga., division electrical engineer of the company.

The personnel of the office is as follows: Superintendent's department: Jesse Hargrave, superintendent; J. R. Parker, chief clerk and cashier; Mrs. M. M. Scully, stenographer, and J. H. Carreker, clerk. Business office: T. D. Jackson

DIAGRAM OF SIXTEENTH FLOOR SHOWING THE ARRANGEMENT OF OFFICES OCCUPIED BY THE POSTAL TELEGRAPH-CABLE COMPANY.



manager: J. W. Majors, bookkeeper and cashier; E. B. Havis, assistant bookkeeper; Miss J. M. Tanner, receiving clerk; G. J. Nealeans, delivery clerk; Miss G. Newell, telephone clerk; Miss F. M. Edwards, call circuit clerk; W. J. O'Brien, night clerk; L. E. Schleichauf, collector; Miss G. B. Gregg, manager Morris Avenue Branch; Miss V. Fuller, manager Union Depot Branch.

Operating department: A. Klein, chief operator; B. P. Hancock, traffic chief; E. N. Andrews, wire chief; L. A. Angel, night chief; E. E. Hyndinger, all night chief; J. E. Rowe, quadruplex and repeater chief; T. W. Collins, night traffic chief. Operators: J. C. Bishop, R. L. Figgatt, M. M. Howard, J. A. Price, J. H. McCulla, R. L. Thomson, C. Q. Purnell, J. R. Rogers, R. Seigler, J. L. Williams, A. C. Bailey, C. F. Gregg, D. O. Hood, R. E. Windham, C. V. Barfield, W. S. Mohsberg, J. E. Hamil, J. S. Coyle, E. A. Crawford, G. E. Zellner, J. A. Clemmons, C. H. Pope, V. H. James, W. C. McCain, E. K. Flint, H. H. Jackson, G. H. Neabrey, J. A. Latture, B. F. Mapp, J. A. Caldwell, H. E. Barfield, C. J. Raley, J. T. Pollard, R. A. Weltz, P. H. Perry, C. M. Cavanaugh, G. D. Hodge, M. S. Levy, J. C. Tatum, C. P. Copeland, C. E. Senseman, L. E. Gray, W. Z. Higgins, V. C. Blake, C. Stewart, C. H. Sprake, M. D. Healy, L. Cohen, T. N. Davis, E. K. Andrews, L. F. Mathews, E. S. Heninger, E. A. Davis, R. H. Stamm, C. O. Love, B. Howell, J. F. Sturm. Clerks: Miss R. P. Bishop, timekeeper and clerk; Miss M. E. Sloan, day service clerk; H. Olmstead, night service clerk; Miss M. Harris, Miss E. Higgs, Miss A. Hicks, Miss L. Haines, F. Harris and J. D. Johnson, check clerks. Linemen: H. W. Lewis and J. A. Daldrup.

Dinner of English Telegraph Engineers.

The sixth annual dinner of the Post Office Engineers of Great Britain was held in London, February 16, Major W. A. J. O'Meara, chief engineer, presiding. The postmaster general, Honorable Sydney Buxton, in the course of his remarks complimented the engineers upon the great improvements which they had made in the wireless telegraph service during the past year. Mr. W. M. Mordey, president of the Institution of Electrical Engineers, in his address related that there was a young man whom he knew as a draughtsman and designer in a dynamo works. He was getting small pay and, being ambitious and able, was not satisfied. A little money came into this young man's hands in connection with a patent. He came to Mr. Mordey and said that now he had received this money his wisest course was to go home and study telegraphy, as he believed there were greater opportunities in telegraphy than in heavy engineering. He went home, and not long afterwards he came back and asked Mr. Mordey to go and see his cable repeater. The young man's name was Sidney Brown. By applying to submarine telegraph work ideas and knowledge obtained by the study of heavy engineering condi-

tions he was able to solve a problem that had for many years baffled Kelyin and other prominent engineers.

Major O'Meara announced that the French Government had issued an invitation for the next International Convention of Telegraph Engineers, to be held in Paris in 1910, and that he had been authorized to accept the invitation.

The John W. Mackay Junior Fellowships.

In July, 1906, Mr. Clarence H. Mackay, jointly with his mother, Mrs. John W. Mackay, gave to the University of California \$100,000 for the endowment of the John W. Mackay Junior Professorship of Electrical Engineering, with the proviso that such part of the income as the regents of the university might determine, or the whole, was to be used for the salary of the incumbent of the chair, and that the residue of the income was to be devoted to the furtherance of research work in electrical engineering in the university.

In accordance with the terms of this endowment, the University of California has established two John W. Mackay Junior Fellowships in Electrical Engineering, of an annual value of \$600 each. The tuition charges of the university are nominal. These fellowships are open to all properly qualified university graduates. The object of the fellowships is not to facilitate ordinary engineering or scientific study, but to enable students who have completed a college course to do research work in electrical engineering, with a view to aiding the advance of the application of electricity to scientific and industrial purposes.

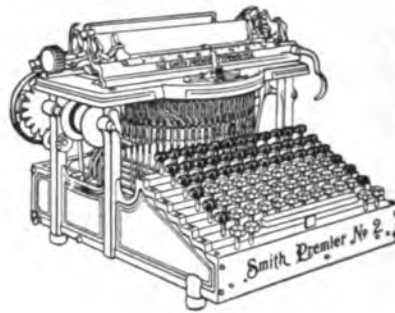
The place of residence of those holding the fellowships is to be at the University of California. Experimental or other work, however, may be carried on outside the laboratories of the university. The appointment to each fellowship is to be for one year, which appointment may, however, be renewed, at the discretion of the graduate council of the university.

Deterioration of Lead Sheaths.

Mr. Thomas G. Spencer, in a paper, read at a recent telephone convention, divides the causes for deterioration of the lead sheaths of aerial and underground cables into six general groups, namely, mechanical injury, chemical decomposition, electrolysis, vibration, lightning, and impurities in the lead. In order to protect the cables from chemical decomposition and electrolysis he said it is desirable to build the conduit so that no water will ever lie in it—that is, the duct should slope from the middle both ways to the manholes; the joints should be absolutely watertight; electrical surveys should be made frequently, and the cable should be grounded where necessary.

The effect of vibration is to crystallize the lead. Vibration may be caused by too much slack in the messenger, too little slack in the cable, the use of long spans, or by suspension from vibrating structures.

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APRIL 1, 1909.

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 principle cable codes, will be sent to any one asking for the same.

The Question of Underground Telegraphs.

There seems to be considerable confusion in the minds of the newspaper fraternity throughout the country on the question of underground and overhead telegraph service, growing out of the wire disturbances in and around Washington, D. C., on March 4th. The blizzard on that occasion was unusually disastrous to telegraph and telephone lines, and the fact that the storm occurred on inauguration day, when the eyes of the country were centred on the capital city, attracted unusual attention to this class of disturbances, which to telegraph and telephone companies are not new or unexpected. Many newspapers are clamoring for the burial of the wires connecting the important business centres, and interviews are being published from every one who is willing to express an opinion as to the possibility of furnishing to the country a more stable telegraph service. It is amusing to read the various remedies offered to prevent a recurrence of the Washington situation. Even the

technical press is offering to the telegraph companies suggestions that, if the authors stopped to consider, would dawn upon them as totally absurd. One paper states that, "if telegraph wires are to be overhead they should be few in number and pushed to high capacity by modern methods of fast mechanical working. It has been over and over again demonstrated that any one of numerous systems of fast telegraphy can increase the capacity per wire many fold. With a few wires of high tensile strength forming a system designed like a first-class power transmission line, the present volume of business could be done without material risk of interruption from storms." The writer of this statement evidently did not stop to think that the pole lines were not overloaded by any design of the telegraph companies to invite disaster during great storms, but that the multiplicity of wires is occasioned by a desire to meet the demands of the public. High capacity trunk lines between commercial centres are of no value in distributing the hundreds of thousands of messages daily to from thirty to forty thousand small towns and offices, not one of which has any use for high capacity machine telegraphy, and yet all of them have daily use for telegraph circuits. How all of these places can be joined telegraphically by three or four trunk lines and how the hundreds of customers with private leased wires can be served without a multiplicity of wires on the poles, we fail to understand. During the recent disastrous break in and around Washington it was found that over one hundred trees were blown down, carrying the telegraph structure with them. Would a system "designed like a first-class power transmission line" have withstood this harsh treatment?

Conditions in this country are not similar to those existing in England, Germany and France, where there are somewhat extensive underground telegraph systems which, however, are not free from interruptions, the English system being out of service, we understand, as many as seven times in one year. The distances between cities in these countries are short and there are not the same number of important points to deal with, as in the United States, where there are over a dozen cities with a population of more than a quarter of a million, all of them widely separated from each other. On another page of this issue appears an article from a New York daily publication, written apparently by an expert, who quotes largely from underground statistics furnished by the technical engineer of the British Postal telegraph service. The information is exceedingly interesting and is worthy of study, but it must be remembered that in England the trunk lines comprising the underground system in no case stretch out in more than three directions and each line reaches several important cities. In this country an underground system radiating from any of our large centres would extend in the direction of every point of the compass, and with one or two exceptions a separate line would be required to reach

each important centre. The underground question in the United States is an extremely intricate one for telegraph engineers to solve.

It must not be imagined for a moment, however, that they are neglecting the subject. Far from it. They have not failed, in years gone by, to study the question of underground service from every point of view and are continually investigating the problem. They have, however, no thought of adopting the suggestions of some self-constituted authorities, who advocate that the various distant cities should be connected by cables similar to those used for submarine purposes. It is proposed to work these cables by means of the siphon recorder, which will reduce the speed of transmission one half. This is far from a solution of the problem; it rather aggravates it. It would require several hundred such cables to carry the business of one of our average size cities, making no allowance for the slowing down of the service which would result in cable working. The public would protest against exchanging the present rapid system of communication for that of cable working, which would mean a reduction in the speed of transmission to from fifteen to twenty words per minute. It should also be noted that submarine cables would not be free from possible interruptions.

The problem of operating underground wires effectively has not by any means been solved even in foreign countries, and because of the electrification of the earth by electric railway companies using the earth as return circuits, it would be very difficult at best to maintain an underground system. Until a feasible system is brought to the attention of the telegraph managers there is nothing left for them to do but to continue to repair the damages wrought by the storms, notwithstanding the fact that an enormous expense is entailed.

Postal Telegraphy and Strikers.

Those who still believe that the interests of all concerned would be better served if the telegraphs in the United States constituted a department of the government postal service, will be interested in the recent strike that took place in Paris, France, where those identified with all branches of the postal service maintained a vigorous movement, lasting long enough to prove that governments were not free, as many declare, from this specie of disturbance. A strike invariably proves to the world at large the utter folly of resorting to violence as a means of adjusting grievances, imaginary or real. This seems to be a hard blow to the advocates of postal telegraphy in the United States, who advance as one of the strongest reasons why the government should take possession of the telegraph lines in this country the argument that under such control disturbances to wire facilities by strikes could never take place.

In Australia at the present time a royal com-

mission which was appointed by the Federal Parliament to inquire into complaints made by the telegraphers of South Australia, is investigating the evidence covering their grievances, placed before it by the telegraphers of that country. In the complaints relating to their disabilities under a government monopoly the telegraphers claim that the very severe treatment meted out to them is due to the fact that one man, the commissioner of telegraphs, absolutely controls their destinies officially. It is stated that this particular official has a mania for achieving uniformity in the service under conditions which are not uniform, and to serve his ends he has distorted the meaning of certain statutes—particularly that clause in the constitution which says that each telegrapher, transferred from the old state service when the Commonwealth was established, shall preserve his existing and accruing rights under the Federation.

In the United States, where the telegraph is in the hands of private corporations, employees who are dissatisfied with the conditions under which they labor have the satisfaction of being able to enter the service of another company without prejudice. This is a condition that does not exist where the government controls the telegraph and where a monopoly in fact exists. Such monopolies, although governmental, control absolutely the destinies of large numbers of employees. In the United States and Canada this is not true, and we hope for the welfare of all those concerned that similar monopolistic conditions never will prevail in this country.

By a recent decision of the Indiana Supreme Court a telegraph company does not violate the law by charging an extra ten cents for delivering a message in a city to a point distant more than a mile from the office.

Mr. W. J. Camp, electrical engineer of the Canadian Pacific Railway Company's telegraphs, Montreal, Que., in a recent letter had this interesting statement to make:

"I received a letter from Argentine, South America, in very fair English. In this letter the writer asks to be excused for the bad English, but is forced to write under the supposition that it is difficult for me to read Spanish, and states that with a great deal of trouble he had studied English in order to 'read our practical and interesting literature, books and papers as per example 'Telegraph Age,' the best in the world.' This is from Mr. J. Bramoso, of the Central and South American Telegraph Company.

"I do not think he is very far wrong in saying that 'Telegraph Age' is the best in the world."

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Underground Lines.

An article in a recent issue of the New York Sun, commenting on the blizzard which demoralized the telegraph service in and around Washington on March 4, has the following to say on the subject of long-distance underground telegraph circuits, a question that is now being agitated by newspapers in many sections of the country, and is attracting wide attention. The article says in part:

With the possibilities of national calamity brought before the country so recently and clearly a demand has been made on every side for a more enduring means of telegraphy than the present overground wire system. Luckily the last instance was one which piqued the country's curiosity more than it affected its pocketbook. It caused more hardship to pleasure seekers than distress to any one class, excepting the telegraph and telephone companies and the railroads. It was a time of public interest rather than one of public necessity. The inconvenience to which the inauguration was subjected proves a small matter when compared to similar conditions in time of national peril. Many say, "Let it be a warning, American luck has its limitations." Few will deny that the conditions which isolated Washington on March 4 and 5 might easily have produced a second useless battle of New Orleans. Such situations are not new. Hardly a winter passes that the telegraph service is not upset by storms of sleet or snow.

In 1840 the public and telegraph promoters received the first taste of the medicine. That winter the Middle Gulf States, Kentucky and Tennessee, went for four weeks without telegraphic communication owing to a sleet storm. The great blizzard of 1888, which cut off New York and Philadelphia from all communication with the outside country and debarred Boston from all similar privileges, proved by far the worst blow of the kind New York has received. Every overhead telephone, telegraph or fire-alarm circuit was overthrown. Many saw a light at that time, for one twelve-mile underground telegraph circuit used for fire-alarm service remained intact. At the present time virtually all electric wiring in the city is underground, and New York boasts of its telephone service. Weather conditions no longer disturb local electric communications. Massachusetts, New York and Pennsylvania were visited by a bad storm in 1904 which again cut off the city for nearly twenty-four hours.

Following each of these storms the business interests, and especially the banking and commercial interests, were urgent that some means of relief be hit upon. Many went so far as to demand government interference toward obtaining a reliable system. It was pointed out that with the exception of the United States, all great military powers control the service of electrical communication in time of peace as an item of the civil budget. Such a condition was brought about by the failure of a civil-military control. Where-

ever the plan was tried good results were obtained in cities by placing the wires underground, and the public generally came to look upon this method as the proper remedy. Though the arguments for and against the underground plan are many, it is generally admitted that in the final analysis they resolve into a single question—that of expense.

Mr. T. E. Herbert, engineer of the British Post Office Telegraphs, in his book on telegraphy, puts the whole matter in a nutshell. He said:

"The objection to underground circuits is chiefly upon the score of cost. It has been shown that the working speed of an underground wire is considerably less than that of an aerial circuit, but, by increasing the diameter of the copper conductor and the thickness of the gutta-percha covering, the working speed may be increased to any required value. This increases the cost of the wire itself and also the cost of the conduit, since a much smaller number of larger wires can be accommodated within a conduit of given size. The same principle applies to air space and paper core cables, and therefore it may be said that the objection to underground routes is solely on account of the expense. The electrical disadvantage (the reduction of the working speed) attendant upon the use of underground circuits presents not the slightest difficulty when the question of expense is ignored."

In England, where the underground system with its freedom from the effects of storms has been brought about by popular demand, many of the wires are held in reserve, as the circuits were not constructed for rapid work. Leading cities are connected by these reserve wires, which it must be admitted are open to certain minor dangers from carelessness and accident. The entrance of water into a cable also offers a menace, for it is more difficult to overcome than minor accidents to ground lines. Such faults are rare, but may lead to serious complication unless caught by careful tests of the line. It is in such instances that well-placed and constructed manholes and conduits are appreciated and return with interest the capital invested in them. The locating of a fault is a mere electrical test, and is not looked upon as a serious problem in underground work.

Those familiar with the telegraph and telephone say that the arguments for the aerial system are cheapness, accessibility and better electrical properties. The working speed of an underground wire is less than that of a free wire just as its capacity is greater.

Mr. Herbert is the authority for the statement that in cases where many wires are required an underground route costs less than many open wires. The underground wire is free from interruptions due to storm conditions or from disasters to the insulation. It runs a minimum of risk from road repairing, electric light feed wires or ground disturbances. The accurate localization tests dispose almost entirely of the problem of accessibility if the line was installed properly.

It is on the induction and retardation found in underground cables that the opponents of the subterranean system choose their arguments. The aerial telegraphic circuit of the present time is usually completed by a ground return. The single wire necessary suffers little from induction, which may be called the influence exerted by one electrified body through a non-conducting medium upon the adjacent body, and is best illustrated to the layman by the "cross talk" sometimes heard over the telephone. This is a small matter on short lines. When, however, telegraph wires are placed in the ground and brought into close proximity for long distances in cables inductive interference follows. The well-insulated wires or conductors, and it may be said that much depends on the nature of this insulation, are placed in cables, which in turn are run through ducts in conduits with manholes at frequent intervals. If the wires in a cable are twisted in pairs the inductive force of each wire is balanced by the opposite effect of its partner, while there is no effect upon the circuit.

The retardation is caused by self-induction or the induction from a nearby electrified body, and depends roughly upon the electrostatic capacity of surrounding bodies. If this becomes too great there will be a retardation, or slowing up in the speed of signaling, which will, of course, effect the line's use for high-speed work, where it is necessary that the different impulses sent over the line shall follow one another with great rapidity. The nearer the wire is placed to the earth the greater the electrostatic capacity becomes. It is apparent that under these conditions speed increases as the wire is raised above the earth. When, however, the conductor is buried it becomes necessary to complete the circuit by other means than a ground return, and a second wire is called into use. The result is a metallic circuit. Here is where a point is made against the underground system, for it is clear that the metallic circuit requires exactly twice as much wiring as the ground circuit, which operates with but one wire. The expense of installation is therefore tremendously increased by this one item. Again, to overcome the retardation and bring the working speed up to the demands exacted, it is necessary to enlarge the size of the wire and the amount of its installation, which in turn increases the size of cables, conduits, etc. It is therefore pointed out that the great expense incurred in order to secure underground service equal to that of aerial lines, is not justified by the results obtained. It is admitted generally that the metallic circuit when applied to high-speed wires eliminates all trouble caused by induction, though at a terrific sacrifice in cost of installation.

According to Mr. Herbert, a long series of experiments in England resulted in the designing of a cable which not only eliminated the necessity of two conductors for each circuit but also prevented inductive disturbances even when the circuits ran together in the same relative positions

for long distances. This design is known as the "paper core screened single conductor cable." Roughly, it is composed of a copper conductor covered with three spiral wrappings of paper with a helical air space. This wire and insulation is then wrapped in a final paper and covered with copper tape. The conductors are enclosed in a seamless lead sheathing. The substitution of paper and air for the old gutta percha covering reduces the capacity, increases the insulation resistance and the working speed, while the copper tape disposes of inductive interference.

"This type of screwed cable represents the standard practice of the Post Office for telegraph circuits," writes Mr. Herbert, "and circuits of any description may be worked in any position in the cable, and may run together in the same relative positions for indefinite distances without a trace of inductive disturbances."

It would seem that the invention of such a cable has given the arguments against underground conductors a severe blow, for the alleged expense of installing a metallic circuit is done away with, while the speed capacity is increased with the cutting down of retardation. The slight increase in the size of the wire necessary in order to secure the speed of an aerial line would be the only extra cost above the difference in the expense of the two forms of installation.

The opinion of the English telegraph officers who operate the telegraphs as a division of the Post Office is not to be considered lightly in this matter. The overhead wires in England are subjected to much the same strains as those in America. The agitation for the underground system in England began years ago. Ever since, when in the years following the invention of the telegraph the overground system was adopted because of the poor results obtained under ground, on account of the defective insulation, there have been many persons who sought to put the wires in the earth. In an editorial in an English paper in January, 1887, the causes for not following the plan are given as two, expense and lack of speed in the transmission of messages. While remaining silent on the financial point the article comments on the second reason as lacking force and adds that excessive speed is not of great importance. It points out that the overhead wires could be maintained for the use of those who sought speed providing they chose to pay a higher rate. It is believed that such an argument will never be raised here, for it is doubtful if Americans will accept any waste in the present economy of time, even though it proves necessary to disregard expense to keep up the present rapidity of communication.

In the closing years of the last century several sections of underground wiring were laid between cities in England. They were held in reserve for the greater part. Demands poured in for greater outlays, but owing to the great expense and believing that a system of poles and wiring could be produced which would withstand the

weather, the government was reluctant to continue the work on a large scale. Later it was admitted that the overland routes had reached the limit of their stability.

Though the speed capacity of the wires was greatly reduced by the underground installation, the demand for emergency cables continued, and to-day England is honeycombed with them. Before this result was brought about the question had settled down to one of expense.

Thomas A. Edison is quoted as saying that no reason exists why all wires operating electric apparatus should not be underground, except expense. In the eyes of the law expense is not an excuse, and it may be that what England has obtained through government control can be obtained here by government interference.

Telegraph and telephone officers realize the losses they have sustained through the upsetting of their lines. Any remedy prescribed must be administered to all sections of the country in which storms of violence occur. Broken limbs, fallen trees, ice-covered wires, lightning, fire and washouts, have all overthrown the present system at one time or another. Frequently the cost of repair equals that of construction. Despite disasters such as that of March 4, on which the loss is estimated at many hundred thousands of dollars, the financial engineering and operating difficulties of installing and running the underground system have been deemed so great that it may be said that no American company has voluntarily considered the change to any extent.

In many quarters the advisability of an emergency underground cable has been discussed. It could be used in those sections where overground wiring is out of order. By a series of substitutions the retarding influence would be less pronounced. This would do away with the necessity of using a long underground wire at one time, but rather a long alternating wire partly above and partly below ground. Engineers say that such a system has drawbacks peculiar to itself. It has also been pointed out that the introduction at frequent intervals of automatic telegraph repeaters would stop much of the dreaded retardation.

It is difficult to estimate the expense of placing the present overland routes, which consist of nearly 270,000 miles of poles and close to 2,000,000 miles of wires, in cables. Each section would be installed under conditions peculiar to itself.

In England the cost through the rural districts runs from \$5,000 to \$7,000 per mile. It has been estimated that a fifty-conductor telegraph cable could be run underground from New York to Philadelphia for \$6,000 a mile. There are in the neighborhood of three hundred wires running between the two cities at present. Such an estimate is based on an assumption of the use of the standard cables of the English post office. If metallic circuits were employed the efficiency would be halved, as two wires are then necessary for each circuit.

Many engineers are positive in their statements that the present underground work in the cities affects the work of the duplex and quadruplex telegraphy. These same men, however, have in many instances advocated that small reserve cables be laid and held ready for emergency. They appreciate the danger to which the present system exposes the country.

Despite the good work which wireless telegraphy has done on land and sea during the last few years, it is fair to eliminate it as a stable means of communication.

The last few months have demonstrated that it is still at the mercy of weather conditions and unreliable in its propensity for work. As yet it has never been available for long distances over land and can only take the place of one overland circuit working in one direction at a time. Last but not least the towers and vertical wires of the wireless system are apt to fall victims to the same weather conditions which overthrow the overland routes, nor are they repaired in a much shorter time.

A New Barclay Printing System.

John C. Barclay, assistant general manager and electrical engineer of the Western Union Telegraph Company, New York, has invented a new printing telegraph system which is about to be tested between New York and Newark, N. J. This system is both simple and accurate in operation. The sending over the wire is direct from a keyboard, and the letters are printed in page form at the distant end at the speed of forty-five words per minute. This printing system is extremely flexible, making it adaptable to meet average telegraph conditions. It admirably meets the requirements of railroad traffic, as well as commercial work, and it can be operated any distance that Morse instruments can be worked. The power necessary to operate the instruments is furnished locally and no increment of current is on the main line. The device can be worked duplex as well as single, and is designed principally to meet the business requirement of the smaller telegraph offices which handle upwards of fifty messages per day. The system has a capacity of 800 messages per day worked duplex.

Copper Wire Depredations.

The railroads and telegraph company in the vicinity of Webster City, Iowa, have suffered big losses of copper wire since the recent big storms in that part of the state. Wholesale robberies of this wire have been committed wherever lines were down. The extent of the depredations were discovered when the linemen reached that vicinity. Practically every foot of copper wire between Webster City and Iowa Falls, a distance of thirty-five miles, was stolen.

A canvass among junk dealers revealed much of the wire. In disposing of the wire the thieves cut it up and rolled it into small balls, disposing of but a few to each dealer.

The Military Telegrapher in the Civil War.

PART XVI.

William J. Dealy, of New York, who since 1893 has held the responsible position of superintendent of the Commercial News Department of the Western Union Telegraph Company, was a well-known and highly-trusted military telegrapher during the Civil War and took an active part in events happening in and around Washington during that stormy period. In writing in 1878 to Colonel William R. Plum, the historian of the military telegraphers, he gave the following interesting account of his experiences at the time of the Baltimore riots, which occurred at the breaking out of the Civil War, and during the following years:

In April, 1861, I was in the service of the Philadelphia, Wilmington and Baltimore Railroad Company, and was sent from my regular station, Magnolia, to a new office at Back River, six miles north of Baltimore. There was a guard of six or eight armed men in the service of the railroad company sent to Back River, to prevent interference with, or damage to, the bridge. April 19, the Sixth Massachusetts regiment, on its way to Washington, unarmed and without uniforms, was attacked in the streets of Baltimore by a mob and driven back. These retreating soldiers caused extra vigilance on the part of the guard and myself. I was on duty fifty-six hours, and finally becoming exhausted, went to bed about 2 a. m., April 22, only to be awakened and captured three hours later. The night mail train from Philadelphia to Baltimore passed south safely and reached Canton, a suburb of Baltimore, where it was stopped by a force of eighty policemen and eighty militia. A bridge crossing a small creek or canal at Canton had been destroyed to prevent this train from going farther. After the passengers and baggage were landed, the policemen and militia took possession of the cars, and compelled the engineer by threats to start northward. I never fully understood why the police and militia did the very thing that it was our duty to prevent and became bridge burners, but I remember their explanation was that Baltimore was excited, and it was necessary as a means of cooling the excitement, to prevent troops from passing through the city for the present. The only effectual way to prevent it was to cut off communication by burning the bridges. They claimed to have the authority or sanction of the city officials for their action. The officer in command of these one hundred and sixty men was a Major Trimble, who had previously been superintendent of the railroad, and was subsequently a major-general in the Rebel army. The first stop of the train on its way back was at Back River, about 5 a. m., where I was hurriedly awakened, and told to jump aboard. I took my instruments with me, considering myself lucky in being saved from the bridge burners that had been long expected, as I supposed the police and militia had come to

protect the road. They then cut down several telegraph poles, cut the wire, and started the train. The captain of the militia, whose name, I believe, was Matthews, told me I was the first political prisoner of the war. Our next stop was Gunpowder bridge, nineteen miles north of Baltimore, where we stopped but a few moments. We arrived at Magnolia, two miles farther north, just as the operator, J. A. Swift, now electrician in the Storm Signal Bureau, Washington, was coming down the road from his home to begin the labors of the day, and he was also made a prisoner. Our next stop was on the bridge that crosses Bush River. Bush River is about six miles north of Magnolia, or twenty-seven from Baltimore. The bridge is three-quarters of a mile long, and built of trestle work, the same as Gunpowder bridge, which is about a mile long.

We were met on the bridge by a south-bound freight train in charge of Conductor Goodwin. It then transpired that the object of the party was to go to Havre De Grace (thirty-six miles from Baltimore), get possession of the railroad company's steamer "Maryland," used to transport trains across the Susquehanna, and scuttle her. In this, however, they were defeated. Swift and myself were now anxious to leave the train as we wanted to get to the next telegraph office, Perrymansville, a mile and a half distant, and warn Havre De Grace, but the doors of the car were locked, and a sentinel paced each platform. Conductor Goodwin, however, evidently changed their plans, by telling them it was known at Havre De Grace that they were on the road, and that troops were there to receive them. In fact, he intimated that they might, since he left, have received orders to march and meet them. The freight train, after considerable switching, the road being single-track, was then allowed to pass south. The road has since become double-track, and the old steamer "Maryland" has been superseded by a magnificent bridge across the Susquehanna. The "Maryland" is now owned by the New York, New Haven and Hartford Railroad Company, and transfers trains, passengers and freight between the Pennsylvania depot at Jersey City, and the New Haven depot at Mott Haven. It is a fine ferry-boat, and when on the Susquehanna River, had three tracks and could take seven cars on each, twenty-one in all. She has since been remodeled and can be seen any day on the East River with her trains.

The draw of the Bush River bridge was then burned and we returned to Gunpowder bridge, the draw of which was also burned. At the southern end of this bridge is Harewood station, where we breakfasted. Swift had been released at Magnolia on the way back. About noon, we started again on our backward way, and I found myself again at Back River. The bridge here was about 800 feet long and the bridge tender, a Mr. Butler, since dead, who had been a sea captain, and used to salt his vessel to make it fire-proof, had also salted the bridge. His plan and practice was to

place salt, rock-salt generally, along the timbers in the evening. The dew of night would dissolve it, and the timbers would become impregnated with the salt. When sparks from passing locomotives fell upon the bridge, the salt would ooze out in moisture and smother the fire. Several unsuccessful attempts were made to burn this bridge, but the salt saved it.

I expected to be released here, but it was suggested that I join a light artillery company, then in Baltimore, about to start for Richmond, and probably with the hope of securing me, they took me to Baltimore. I was then released, walked back to my station, Back River, six miles, and after resting, walked to Havre De Grace, thirty more miles. Crossing the burned bridges on hands and knees, and the Susquehanna in a row boat, I took train to Philadelphia, and after reporting to A. W. Decoster, superintendent of telegraph, was taken to S. M. Felton, president, and to Mr. N. P. Trist, paymaster.

Mr. Trist was sometimes referred to as the "Mediator," having carried the Treaty of Peace between the United States and Mexico. I felt quite at home with him, because of his monthly visits in the pay car. He took my deposition of what had occurred, and I was retained at Philadelphia at the depot office "O," Broad and Prime streets, until the following September, when, at the suggestion of my tutor in the mystic art, William B. Wilson, then in the War Department office, I applied for a place in the United States Military Telegraph and received an appointment. Superintendent David Strouse of the military lines, had recently died, and J. R. Gilmore was the new superintendent. I reported September 7, 1861, and was sent with A. P. Pritchard, Jr., M. H. Kerner, and, I believe, W. T. Lindley, to follow linemen, who were building, and to open offices where General Banks might direct. Passing through Rockville, Md., where we saw L. A. Rose, in the office there, we reached Darnestown, Md., about dusk, September 10. Pritchard and myself stopped here and Kerner and Lindley went on.

Darnestown is twenty-five miles from Washington, named after the Darnes family there. Major Darnes was in the Mexican War and was neutral during the Rebellion. Having retired from the army, unwilling to fight against the south, he at the same time remembered the old flag, and like many another southerner between two fires, suffered from both. Pritchard and myself, with the linemen camped on the property of a Dr. Bell, but were aroused, just as we had fairly settled for the night, by orderlies or couriers from General Banks with orders to open an office at the end of the wire.

Casting about for a location, we opened by the roadside, in what had evidently once been a pig pen. Roofing it over with our blankets, we sat by our relay all that rainy night. We moved into the town about ten o'clock the next morning, established ourselves over the store whose proprietor, S. M. Fisher, was also the postmaster and

boarded with him. It was one of his customs to have a full tumbler of rum toddy every day at dinner, and after passing it around to his wife and grown children for each of them to take a mouthful, he would himself sip what was left. At our first dinner, Pritchard was on the old gentleman's right, and, of course, was the first to receive the tumbler. He was a temperance man, but nevertheless accepted, and, not knowing of the custom to pass it along, held it, and disposed of all the toddy. No pen picture can describe the astonishment of the Fisher family, nor the effect upon Pritchard, who, having taken cold during the night in the pig pen, soon afterwards left the service.

I remained at Darnestown nine or ten months, during which time many operators came and left, among them R. R. McCaine and Stephen Sargent, both since dead. "Steve" hailed from Port Jervis, N. Y., fresh from the North, with his good clothes direct from Washington, he galloped along right merrily, and was almost within sight of his journey's end when his horse, in stooping to drink, pitched his rider, as if from a springing board, into the creek. Thus wet and dripping, he arrived and introduced himself, but the army was famous for sanitary supplies, and these were the remedies, frequently applied, which restored him to good condition. I think it was in June, 1862, that I was ordered to Harper's Ferry. George Lawrence and Cephus C. Starling were there. The latter is since dead. He was a good-hearted fellow, and often with his guitar, would carry us back to scenes of home in harmony and song.

I do not remember anything out of the usual routine at Harper's Ferry, until about September 10 or 12, or perhaps a day or two later, we began to realize that the rebels were on all sides of us, and closing in for a battle.

Col. Dixon S. Miles of the regular army, commanded at Harper's Ferry, and his force was said to be about 10,000 men.

D. J. Ludwig, now manager of the Commercial News Department, Gold and Stock Company, New York, had charge of the Baltimore and Ohio railroad office at Harper's Ferry. He boarded with a Mrs. Chambers, whose son, Marshall, was in the Rebel army.

Marshall had obtained leave, and had been passed within our lines during the week, say between Sept. 10 and 16, remained for a day or two, and was not seen again until he rode into town with Stonewall Jackson's troops, after the surrender, which, I think, occurred September 16, perhaps 15, 1862. A day or two before this, J. D. Tyler and Charles H. Lounsberry had arrived from Winchester. (Lounsberry since dead.) R. R. McCaine, cipher operator at Winchester, also arrived with Tyler and Lounsberry. (McCaine also since dead.) There were two or three days' fighting at Harper's Ferry. It is not necessary to describe the battle. Generals Longstreet, A. P. Hill and Stonewall Jackson captured Col. Miles' army, etc., and took possession of the town.

Miles was struck by a piece of shell on the calf of his leg, almost simultaneously as the flag on Bolivar Heights was struck. He lived but a short time, probably bled to death. During the fight we discovered a stranger on the wire. He claimed to be within three miles of us on the Maryland side. Had occasional remarks from him, questions or comments, relative to messages passing over the wire. He really got no information of value because everything of importance was in cipher, and whenever we had a doubt as to whether he was cutting us off we exchanged some word or sign that could only be understood and answered by ourselves. He promised to call upon us soon, and no doubt he saw us when the fight was over, but we missed the pleasure of his call.

Lawrence, Lounsberry, McCaine, Ludwig, Starling, Tyler and myself, were prisoners twenty-six hours and then escaped, by mingling with the troops who were paroled by regiments and allowed to pass beyond the lines. Lawrence and I marched out with the Garibaldi guards. We did not meet or join the others until we arrived at Frederick, Md., before the surrender at Harper's Ferry. We destroyed the instruments, battery, etc., throwing most of the pieces into the Potomac River. From Frederick, Tyler and myself were ordered to Boonsboro, Md. We left Frederick about nine o'clock p. m. with two cavalymen as escorts, and reached Boonsboro (distant about sixteen miles) about 11:30 or 12, passing on our way over the battle field of South Mountain. I think Tyler remained about six weeks. Have forgotten where he went to then. I remained until morning of January 1, 1863, when J. H. Emerick, who had just closed the office at Sharpsburg, Md., joined me in a ride on top of the stage coach to Frederick, whence we took train for Washington. We will never forget that stage ride in the drizzling rain. Emerick then went to the front, and, I believe, was made cipher operator. I went to Alexandria, remained there at the railroad depot office six weeks. John S. Kerbey (since dead) was there; also Richard Graham. While at the city office, O. H. Dorrance, now superintendent of the International and Great Northern Railroad, Texas, and _____ McMullen, since dead, held forth. From Alexandria I went to War Department office, Washington, remained there until the following July and then went to Fort Monroe, Va.

I cannot now recall any special incidents of interest that occurred at the War Department while I was there, though, no doubt, scarcely a day passed without something worthy of a place in the "History of the United States Military Telegraph." President Lincoln, as a rule, was in the office as early as five o'clock in the morning. He would read the messages received during the night, sometimes refer to the maps that hung on the walls, and in his plain and earnest way, would give his views. His monument is in the heart of every man who ever breathed his name, and even

when the Rocks of Ages will have crumbled, there will be a something besides the spirit that prompted his charity toward all, and malice towards none, that will recall the man.

The Telegraph Force of Chicago During the Civil War.

BY LEVI S. WILD, MANAGER WESTERN UNION TELEGRAPH COMPANY, BUTTE, MONT.

The article in your issue of February 16, giving the description and personnel of the Chicago office in 1869, is a very interesting retrospect. This was forty years ago. Let us take a glance at the Chicago office five or six years prior to '69 during the Civil War. At this time the Western Union end of the office, which was located on the second floor at the corner of Lake and Clark streets, operated less than a baker's dozen of circuits. Emory Cobb, now a retired banker residing at Kankakee, Ill., was superintendent; Robert Rankin was manager; George A. Burnett, whose death was recorded in the March 16 issue of Telegraph Age, was chief operator. The operators and their circuits were: Frank C. Beach, George Makle, Joseph Pierce, New York; George C. York, Buffalo; Lige Taylor, Pittsburg; Charles York, George Hoyt, Salt Lake Overland; Terry Terrill, Douglas Burnett, Milwaukee; Clem Smith, Cincinnati and Indianapolis; Levi S. Wild, Detroit. Robert W. Martin and William Kelsey handled the night Associated Press, which was sent from Buffalo and given Milwaukee through a button repeater.

The Board of Trade was on South Water street near the Clark street bridge. There were three circuits out of this office to Buffalo, Buffalo docks and Milwaukee. A. H. Bliss and L. S. Wild were operators during "change." Mr. Bliss afterward became a member of the Board of Trade, amassed a fortune, and some years ago retired from active business life. He is now engaged in what is to him the pleasant duty of making other people happy. The Illinois and Mississippi (Caton Lines) occupied the Clark street side of the office. These lines extended to all important points in the north and southwest. Of the operators in that service I recall Fred H. Tubbs, chief; Jud Moore, L. C. Springer, Albert L. Baker, Charles H. Mixer and L. D. Cord. At the close of the war in 1865 business in Chicago increased by leaps and bounds, and the office force was rapidly augmented to meet the requirements.

It is a noticeable fact that juniper and cedar poles did not stand the strain of the recent blizzard in and around Washington anywhere near as well as chestnut poles.

There is much for telegraph operators to learn respecting their calling which can be readily obtained by reading *Telegraph Age*—\$2 a year.

The Telephone For Train Despatching.*

BY W. E. HARKNESS, OF NEW YORK.

Although the telephone has been in use for years in connection with the transaction of business between the various departments of railroads and has become a universal means of transacting commercial business, it has not, until recently, been considered on an extensive scale as a substitute for the telegraph in the despatching of trains on steam railroads.

During the past year, however, considerable thought has been devoted to the use of the telephone in place of the telegraph for the directing of train movements and the despatching of trains.

There are several reasons for this, the first and probably most important one being the enactment of state and federal laws limiting the working day of railroad employees transmitting or receiving orders, pertaining to the movement of trains, to nine hours.

Another reason, which was brought about by the legislation mentioned, was the shortage of good telegraph operators. It was estimated that fifteen thousand additional operators would be required if the train order telegraph offices in service in 1907 were to be kept open after the new laws were in effect.

The increased expense occasioned by the employment of the additional operators, based on the prevailing rates, was estimated at approximately \$10,000,000 per year.

Still another reason for the introduction of the telephone is the decreased efficiency of the average commercial and railway telegraph operator.

Whether this is brought about by the attitude of the telegraphers toward the student operator or the fact that there are so many opportunities in other branches of the electrical business that appeal more strongly to the young men interested in electrical work has not been determined, but no doubt both have a bearing on this point.

Notwithstanding the fact the telephone is being used daily by the public for the transaction of important business even between points at great distances from each other and further that the railroads themselves have for years used it in connection with the handling of the traffic in their terminals, and in emergency for the directing of trains on the main lines, many railroad employees and officials questioned the advisability of using it in place of the telegraph for the issuing and receiving of train orders.

This is not surprising when it is remembered that the telegraph has been almost universally used for this service since 1850, and where properly installed, operated and maintained, has rendered excellent service.

Further, the employees now engaged in telegraph service are naturally adverse to apparatus or methods of operation with which they are not

familiar and which they fear may affect their positions. Many of the officials in the operating department of the railroads obtained their early training in the telegraph department, and naturally have a preference for this service, and have hesitated to recommend the use of a system which to them is comparatively new and untried.

The installation and successful operation of telephone train despatching circuits by a number of prominent railroads throughout the country during the past year has demonstrated beyond a doubt that this service can be rendered by telephone with equal safety, reliability and accuracy, and further, with greater speed and also at a decreased expense than when rendered by telegraph as heretofore.

Owing to the differences which exist in the construction and operation of the railroads throughout the country, the geographical and climatic conditions to be met, and the volume and character of the traffic which must be handled, it was believed, by some, that while the telephone could be used on some roads it could not be successfully used on others.

While it is true that the differences noted are important factors in the problem, and that the solution which will be satisfactory in meeting the conditions existing on one road may not meet those existing on another, it is equally true that with a knowledge of the conditions to be met, and a thorough knowledge of the telephone art a system can be designed to meet the new conditions and render equal and, in the majority of cases, superior service to that obtained with the telegraph.

This has been confirmed by the experience of those roads who have recently installed the telephone for despatching service as well as those who have for years been using the telephone exclusively for this service or as an adjunct to their telegraph system.

The first questions that are asked when the use of the telephone for train despatching is suggested are:

How does it differ from our present practice of despatching trains by telegraph? And what advantages does it possess over present methods?

In answer to these questions the following differences and advantages are found to exist:

The orders are issued verbally by the dispatcher to the operator or operators over a metallic circuit telephone line in place of being sent by telegraph. The orders are issued word by word, in some cases names and figures are spelled letter by letter to insure accuracy, and the dispatcher writes the order in his book as he dictates it to the operators, thus regulating the speed to such a rate as to enable it to be readily copied by the operators.

The same form of orders is used as heretofore, no changes have been made in their wording and the operators receiving the orders repeat them to the dispatcher as before except that this is done by telephone in place of telegraph.

* Paper read before the St. Louis Railway Club, February 12, 1909.

The manner of calling the stations desired differs from that now employed, in that each station is called individually or any group of stations may be called without signaling the other stations on the line. This is accomplished by means of selective apparatus at the stations controlled by the despatcher who, by pressing a button corresponding to the station desired, can, within a few seconds, start a bell ringing at that station.

When the operators at the stations wish to communicate with the despatcher it is not necessary for them to operate a key or other calling device, as the despatcher's telephone is always connected to the line, and all that is necessary for the operator to do is to place his telephone receiver to his ear, listen to see if the line is in use and if not, talk into the transmitter.

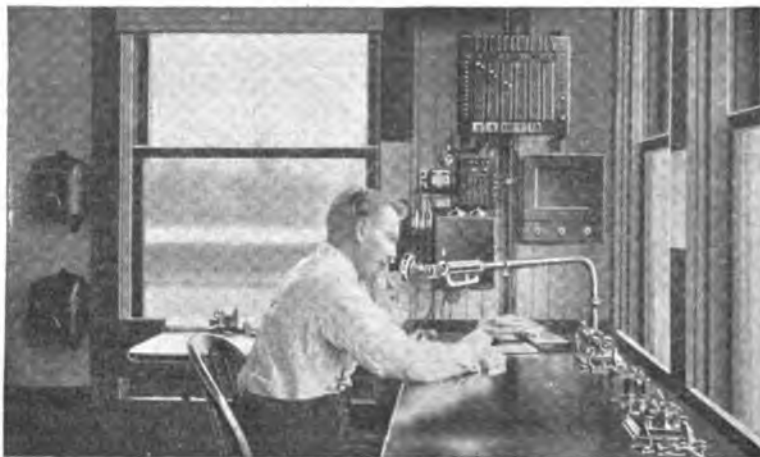
The operating differences can be summed up in a few words by saying that "the orders are transmitted by speech in place of by telegraph and the stations are called selectively and distinctly in place of by telegraph code."

words, an unnatural method of communication is being used to transmit his thoughts, which requires not only manual skill but also mental effort.

A mental strain is also experienced when receiving by telegraph as the sounds received from the telegraph sounder must be translated mentally into letters and words before the meaning is clear.

It will be contended by many that the telegraph operator does all of this translating unconsciously and is therefore not subject to a mental strain. This, however, does not seem to be borne out by the experience of the despatchers and operators who have been using the telephone for despatching work, for in nearly every case the reduced strain has been noticed and spoken of. The fact that they can do the same amount of work by telephone in one-half of the time formerly required by telegraph is sufficient to indicate that they experience considerable relief.

Some of this relief is necessarily physical and



OPERATOR AT WAY STATION USING TRANSMITTER ARM.

The physical differences are the use of two wires in place of one, the use of copper wire in place of iron and telephone and selective calling apparatus in place of telegraphic apparatus.

The advantages possessed by the telephone over the telegraph for despatching purposes are many, as has been demonstrated by those roads who are now using it.

At present the despatcher handling his work by telegraph is under both a mental and physical strain, due to his efforts to keep things moving and prevent delays to traffic and the almost incessant operation of the telegraph key.

The mental strain is not only occasioned by keeping track of the location of each train on the division and planning for their movements and meeting points, but also by the translation and transmission of his orders, letter by letter and word by word, by means of the telegraph key operated by hand and checked by ear. In other

no doubt assists in reducing the mental strain. The abandonment of the telegraph key for calling the stations has been a great physical relief to the despatchers, and in place of calling stations continuously for minutes and not being certain of the operator receiving the call, they are now with a single motion able to give a distinctive and insistent signal and are assured of this signal being received at the station and also of a prompt reply from the operator.

Several stations can now be called in much less time than it was usual to call one by telegraph and the operators have been relieved of all calling of the despatcher.

All of this is accomplished by a minimum physical effort on the part of the despatchers or operators, and this is reflected in their work.

It has been found that the stations answer the signal given by the selector bell much more promptly than they do the sounder. This is par-

tially due to the volume of sound given by the bell and also the fact that it will ring until they answer the call.

The fact that the noise of the telegraph instruments is removed will also have an effect upon the work of the dispatchers and operators.

The calling of stations by the dispatcher while conversation is being carried on with other stations enables a saving in time to be effected.

The greatest saving in time, however, is in the issuing and repeating of orders and the prompt replies received when inquiring as to conditions affecting the movement of trains. This is realized when it is remembered that the highest speed attained by an expert telegraph operator is around fifty words per minute, while with the telephone a speed of one hundred words a minute may be attained without the skill required by the average telegraph operator. The average telegraph operator will send considerably less than fifty words a min-

Greater accuracy in transmitting orders by telephone is insured by the fact that the dispatcher writes down each word as it is spoken instead of sending it from memory by telegraph as is now customary, and the same check is made on the station copies as at present, by having each of the operators repeat the order word for word as written by them, the other operators and the dispatcher all checking each repetition.

While on this subject, which is one of the first objections raised to the use of the telephone by those not familiar with its use and advantages, it may be well to state that as early as 1883, long before the telephone had reached its present high state of development, it was used for operating trains on the New Orleans and Northeastern Railroad. In this case the service was rendered over a single iron wire for a distance of about one hundred miles, and orders issued to four regular trains and numerous work trains. This method of op-



DISPATCHER USING CHEST TRANSMITTER AND HEAD RECEIVER.

ute and in many cases the quality of the sending will be far from good, so that in addition to the speed there will be a difference in quality of service to be considered. The advantage of the increased speed of sending orders by telephone is very apparent when the operators at a number of stations repeat the order issued, for the dispatcher's O. K., notwithstanding the fact that many of the words are spelled letter by letter.

As to the accuracy of the telephone as compared with the telegraph it seems hardly necessary to answer the questions which have been raised in regard to this point when it is remembered that the despatching and reporting of trains on a large number of roads have been handled for a year or more by telephone without mistakes having occurred and, as we are all aware, the telegraph is not free from errors in transmitting or receiving.

eration was followed for over a year and during this period no accident occurred which could be attributed to the use of the telephone.

The Lake Erie, Alliance and Wheeling Railroad has been operating a line of single track road for a distance of about one hundred miles by telephone exclusively for a number of years with equipment not to be compared with that now available for this service. Thirty trains in each direction per day are handled on this line.

The low grade division of the Pennsylvania Railroad between Columbia and Parkersburg, Pa., a distance of thirty-eight miles, has been operated by telephone supplemented by block signals since August, 1906. The average number of trains passing over this division per day is ninety-five and the number of cars 4,800, transporting a total of 280,000 tons.

Many of the Western railroads have for years been using the composite telephone to assist in the movement of trains. These telephones are connected to existing telegraph lines and while the service rendered is not as good as that which is being rendered by a modern despatching circuit, it has been of immense benefit in clearing up congestions of traffic or enabling the despatcher to be notified promptly of break-downs or delays.

In addition to the foregoing there are numerous cases where the telephone is being used, and has been used for years to handle the traffic of large terminals, and, if I am not mistaken, the terminal in St. Louis has been handled in this way for twelve or more years; in fact, the telephone service is absolutely necessary for its successful operation.

(To be continued.)

Review of New Books.

The Filson Club publication, which has just been issued from the press of John P. Morton and Company, Louisville, Ky., contains a biographical sketch of James Francis Leonard, who is credited with being the first telegraph operator to receive by sound. This publication is handsomely printed, contains nearly two hundred pages, and among the numerous full-page engravings are those of Mr. Leonard and Colonel Charles E. Taylor, the latter for over a quarter of a century manager of the Western Union Telegraph Company at Frankfort, Ky., and who was president of the Old Time Telegraphers' and Historical Association for the year 1889.

Among the old-time telegraphers who receive favorable mention in this admirable work are N. M. Booth, the forty-niner of the telegraph, now residing at Evansville, Ind.; O. H. Booth, superintendent of telegraph at Crestline, Ohio; Andrew Carnegie, Ezra Cornell, William J. Dealy, George M. Dugan, Benjamin F. Ely, J. W. Fisher, Dr. Norvin Green, Professor Joseph Henry, George B. Hicks, Amos Kendall, Professor S. F. B. Morse, Henry O'Reilly, Walter P. Phillips, James D. Reid, T. P. Shaffner, F. O. J. Smith, J. J. Speed, Alfred Vail and John Van Horn. Many of the persons named were natives of Kentucky.

The part dealing with the life of James Francis Leonard gives evidence of care and depth of thought in its arrangement by the author. It is accurate in statement, and that portion of the article covering the history of the telegraph is written in a manner that gives this always interesting subject renewed interest. Every admirer of the telegraph will appreciate Mr. Townsend's arrangement of these valuable historical facts. He mentions the organization of the telegraphs and the construction of the lines in Kentucky which began after the passage of the telegraph act by the Kentucky General Assembly on February 27, 1847. A full-page engraving of the monument erected to Mr. Leonard inscribed: "the first sound operator" is shown. This monument was erected by old-time telegraphers in the late eighties as a

tribute to the memory of Kentucky's best operator—James Francis Leonard. The price of this book is \$3.00, and copies may be obtained by addressing John B. Taltavall, Telegraph Age, 253 Broadway, New York.

"Making Wireless Outfits," by Newton Harrison (Spon & Chamberlain, New York, 61 pages, 27 illustrations), is a concise and simple explanation for amateurs on the construction and use of inexpensive wireless equipments which have a range up to one hundred miles. In four chapters it deals with: Waves, how made and how received; how to make the coherer, decoherer, relay and sounder; the use and adjustment of the relay; Marconi's coherer; construction and action of spark coils; effect of daylight on electric waves; antennae and their connection to stations; towers, ground connections, tuning circuits, power required, and the different telegraph codes. This should be a valuable work for those who are interested in building and operating a small station. Price 25 cents. Orders may be sent to J. B. Taltavall, Telegraph Age, 253 Broadway, N. Y.

"Alternating Currents," by A. W. Marshall (Spon & Chamberlain, New York, 90 pages, 36 illustrations), is an elementary handbook on alternating current generators, transformers and motors written for readers who are assumed to have a working knowledge of continuous currents but who know nothing at all of alternating currents. In seven chapters it considers: What an alternating current is, how produced and how measured; transformers and choking coils, alternating current motors, rotary converters and rectifiers. The book is simply written and should prove an interesting and valuable work to those for whom it is intended. Price 25 cents. Orders may be sent to J. B. Taltavall, Telegraph Age.

American Institute of Electrical Engineers' Anniversary Dinner.

The American Institute of Electrical Engineers celebrated its silver anniversary in a dinner at the Hotel Astor, New York City, March 11. The celebration was made the occasion for attempting various new electrical effects. President Ferguson, of the Institute, was chairman and toastmaster, and his opening remarks dealt with the success of the Institute. Cable messages of congratulation were read from the national electrical societies of England, Germany and France, and telegrams of good wishes were received from Professor Alexander Graham Bell in Nova Scotia, Charles F. Brush in Cleveland, and Thomas A. Edison in Florida.

A massive silver loving cup in the name of sixteen of the past presidents now living was presented to Mr. T. Commerford Martin, the senior surviving past president.

President Ferguson stated that the Institute had 6,334 members, and were closing the present month with 6,600, not including about 1,500 students in university branches.

W. H. McCollum Goes With the Telepost Company.

Mr. W. H. McCollum, who has just been appointed superintendent of construction and maintenance of the Telepost Company, New York, has had an extensive experience in line construction work, which naturally qualifies him as one of the most valuable men in that branch of the telegraph service. He first engaged in construction work in May, 1876, entering the employ of the Western Union Telegraph Company, and being assigned to duty under A. J. Brown, city foreman, and F. M. Ricketts, foreman of the submarine cable department in New York City and vicinity.

During the spring of 1878 he left the Western Union Company and joined the construction department of the American Union Telegraph Company under W. H. Fairbank, who was general superintendent of construction, and served under Mr. Fairbank as lineman, assistant foreman and foreman during the life of the American Union Company. He next engaged with the Mutual Union Telegraph Company until it was about to be absorbed by the Western Union Telegraph Company. In July, 1882, he followed Mr. Fairbank from the Mutual Union Company to the Postal Telegraph-Cable Company, being employed as an inspector for the company to supervise the work of the contractors who were building the lines.

In the summer of 1885 he left the Postal Telegraph-Cable Company to accept a position with the New York and Pennsylvania Telephone Company as general foreman of construction, with headquarters at Elmira, N. Y., under W. N. Eastbrook, general manager. He served in the telephone field until October, 1894, when he re-entered the employ of the Postal Telegraph-Cable Company as foreman. In May, 1898, he was promoted to the position of general foreman of the eastern division. In December of the same year he was appointed superintendent of construction of the eastern division. In September, 1906, he resigned on account of ill-health, but after eight months of medical treatment and rest he re-entered the Postal service, being assigned to special duties under E. G. Cochrane, general superintendent of the eastern division. In December, 1907, he was assigned as an attache of the office of Vice-President Charles C. Adams, his duties being to inspect all lines requiring repairs throughout the United States, and passing upon all estimates submitted for construction and repairs by the different division officials.

Three lawsuits against one of the telegraph companies, brought at Louisville, Ky., to recover damages aggregating \$15,000, because of alleged injury to their feelings, resulted in a verdict of fifty-eight cents in favor of the plaintiffs. Injured feelings, fortunately for the telegraph companies, are not rated at a high market value in Kentucky.



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The Railroad.

Mr. G. A. Cellar, of Pittsburg, Pa., Superintendent of Telegraph of the Pennsylvania lines west of Pittsburg, was a recent New York visitor.

The headquarters of the telegraph department of the Missouri, Kansas & Texas Railway, the Katy system, have been moved from Sedalia, Mo., to Denison, Tex. S. K. Bullard is the superintendent and W. H. Hall is assistant superintendent.

The Boston and Maine Railroad Company, S. A. D. Forristall, superintendent of telegraphs, is installing a telephone train despatching system on its Fitchburg division. If the results prove satisfactory this method of train despatching will be extended as rapidly as practicable to cover the entire system.

The general managers of some of the railroads in South Africa award prizes to the station agents along their lines who have the best kept stations, cottages and gardens. The result has been such a decided improvement in the appearance of the various stations that it is with difficulty that a decision is reached as to which is the best kept. Ordinary stations have been made beautiful in appearance. The prizes awarded were \$25 per station, and the railroad management considers this a good investment.

At the meeting of the Railway Signal Association, held in Chicago, March 15, Mr. E. E. F. Creighton, of the General Electric Company, delivered a lecture and demonstration on "Lightning Phenomena." The afternoon session was devoted to a debate on the question whether the scheme of signaling presented at the Washington meeting of the association in October, 1908, is the best that has been devised. Mr. W. H. Elliott, signal engineer of the New York Central Railroad, and Mr. C. C. Anthony, assistant signal engineer on the Pennsylvania Railroad, took the affirmative side of the question, and Mr. J. S. Stevens, signal engineer of the Santa Fe, and Mr. L. R. Clausen, division superintendent of the Chicago, Milwaukee and St. Paul, the negative. The debate related to various systems of signaling and after these gentlemen had used up their allotted time, the discussion became general. Among those who took part in it were Mr. Frank Rhea, of the General Electric Company, and Mr. Sperry, of the General Railway Signal Company, of Rochester, N. Y. By vote it was decided that the negative side was the winner of the debate, but it was understood that this vote has no effect whatever upon the adoption of any scheme of signaling by the association. The object of the debate was to call forth a more general expression of opinion concerning the subject. A committee has been at work for three years in an effort to improve the present practice in railway signaling, and it is expected that the debate at the Chicago meeting will be of great assistance to it.

George Boyce Becomes Superintendent of Telegraph and Signals.

George Boyce, who has been appointed superintendent of telegraphs and signals of the Chicago, St. Paul, Minneapolis and Omaha Railway, effective April 1, to succeed Henry C. Hope, deceased, comes to that office amply fitted to perform the required duties by reason of over twenty-two years' efficient service in various positions in the telegraph and signal department of that system.

Mr. Boyce was born near Parkhill, Ontario, March 2, 1868. He learned telegraphy when sixteen years of age in the office of the Grand Trunk Railway in his native town. He was soon assigned by that railroad to a position as relief operator between Toronto and Sarnia, which he held for fourteen months. He then accepted a place as night telegrapher for the Chicago, St. Paul, Minneapolis and Omaha Railway, and has been employed by that company ever since. By perseverance and strict attention to his duties he ad-



GEORGE BOYCE,
Superintendent of Telegraph and Signals, Chicago, St. Paul,
Minneapolis and Omaha Railway, St. Paul, Minn.

vanced from his original position to day telegrapher, wire chief, acting chief telegrapher, secretary, chief clerk, and finally to the position of signal engineer, which he held at the time of his present advancement.

Mr. W. Heywood Myers, previously general superintendent of the Northern Central Railway and the Erie division, has been appointed general manager of the Pennsylvania Railroad, vice W. W. Atterbury, who has been advanced to fill the position of fifth vice-president.

Mr. William T. Morse, son of Professor S. F. B. Morse, the inventor of the telegraph, who was arrested in January, in Mexico, charged with killing an Indian, has been honorably acquitted by the courts, the killing having been declared to have been done in self-defense.

Radio-Telegraphy.

Francis B. De Witt, a student at Stanford University, is reported in the newspapers as having made successful experiments in the transmission of wireless signals through water.

Many of the commercial operators are accepting wireless telegraph positions at land and sea stations. Those accepting positions on steamers receive an average of \$50 per month, and they are classed with the officers of the ship.

A fire discovered in the cargo of one of the ocean steamers when two days out from port was reported to the newspapers recently. This would indicate that in the near future the Associated Press may possibly have correspondents on all passenger carrying steamers to report the important events that happen during voyages.

Important uses of wireless telegraphy occasionally come to notice. Captains of steamers in mid-ocean telegraph to the agents of the vessel located at the port of destination for machinery and other material to replace parts which have broken since leaving port. The new machinery is ready upon the arrival of the ship, and is placed in position without detaining the vessel beyond her regular sailing time.

The New England Wireless Society has been incorporated at Boston for the purpose of studying and improving wireless communication. Regular meetings are held on the first Friday in each month, and the following are the officers: Harry E. Upton, president; Lawrence J. Malone, vice-president; Charles B. Robinson, treasurer; Benjamin F. Haines, attorney, and Gordon S. Wallace, clerk.

It is interesting to note that one of the disadvantages up to now always alleged against wireless telegraphy, that if you sent a message in one direction it really went in other directions, which indicated careless waste of energy, proved in the collision between the Republic and the Florida a great advantage, the C. Q. D. message reaching no less than four ships and many land stations, all of which were able to get into communication with the damaged vessels.

Another use for wireless telegraphy was made public a few days since when the oil steamer *Asuncion* was off the port of Eureka, Cal., the Humboldt wireless station received a message saying that a sailor had fallen from the rigging, suffering injuries which caused internal hemorrhages. Medical advice for the injured man was asked. The wireless station communicated with Dr. Charles Falk of the marine service, who prescribed treatment, and the steamer received the prescription by wireless while proceeding on its voyage.

A patent was issued on February 23 to Mr. R. H. Marriott for a scheme for determining the distance between a ship and shore station or another ship. The inventor employs wireless telegraph apparatus as one of two simultaneous means of transmitting sound to the ship from the

distant point, the other means involving the water itself. By the use of a bell arranged for submarine signaling there is produced a sound that is transmitted practically instantly to the ship receiver by wireless telephony, and also at comparatively slow speed by way of the water to a separate receiver used by the same listener. The time interval between the receptions of the two signals depends upon, and is used as, a measure of the distance between the bell and the listener.

The Daily Princetonian recently published what was probably the first transatlantic wireless message ever received by a college journal. The message was from Dr. Henry Van Dyke in Paris, and read "Greetings to my Princeton friends." The message was arranged for by letter and cable, and Dr. Van Dyke was to send it at noon. At 2.55 o'clock the message arrived. It required several relays as follows: Paris, London, Waterville, Ireland; steamer *Baltic*, one day out from Liverpool; *Kronprinzessin Cecilie*, three days out from Bremen; *Noordam*, three days out from New York; *Camperdown*, Nova Scotia, Siasconsett, the United Wireless Company, Broadway, New York; School of Science, Princeton.

The National Electric Signaling Company, of Pittsburg, will equip the new government wireless station, mention of which was made in our previous issue. The apparatus, it is said, will be thirty times as powerful as that in ordinary use. This will enable the department to communicate with vessels practically across the Atlantic ocean, and will mark one of the greatest achievements in naval practice. The 600-foot tower in which the apparatus is to be installed will probably be erected at Washington, D. C. The concrete foundation will extend eighty feet into the earth, and will be fifty feet in diameter at the base and eight feet at the top. It is hoped to have the work on the tower started within a month. Between three and four months will be required for its completion.

During a recent debate in the Reichstag, it was stated that of one hundred and sixty-seven German vessels fitted with wireless, one hundred and fifty have Marconi equipment. The requirement of an English operator with Marconi outfits on German steamers was criticised. In replying to the criticism that German wireless systems were discriminated against, a government official said that as the English wireless stations refused to communicate with ships having other than the Marconi system, the German ships had no other recourse than to install the Marconi apparatus. As England had not joined in the international agreement, English ships were not under any obligation to respond to a German vessel carrying another system. It would be a good thing, he said, to increase the number of vessels carrying the German system, but it would not be wise to emphasize too strongly the principle of nationality, since this might influence other nations to insist upon the installation of their systems.

Submarine Cable Repeater.

Up to a few years ago it had been found impossible to automatically repeat from one submarine cable to another when the cables exceeded a few hundred miles in length. For this purpose the primary necessity was a sufficiently sensitive relay and one which was sure in its contact.

The discovery of the principle of the cable relay herewith described was made by Mr. S. G. Brown, working in conjunction with Messrs. Taylor and Dearlove, of London, England, when he found that good electrical contact could be made and maintained by pressing the end of the relay tongue upon the surface of a divided plate and that frictional resistance to side motion of the tongue could be reduced by moving the plate under the tongue or by moving the tongue over the surface of the plate, the movement being maintained in the direction of the length of the tongue.

If this fact is clearly understood, many ways of arranging such a relay will suggest themselves but it was considered that for permanent use, and where the greatest sensitiveness is required, nothing is better than a rotary drum, the drum being divided into three insulated sections, the outer ones being joined up to relays.

Having secured the relay, the next step was to work it through a cable, and to do this two main difficulties had to be faced—that is to say, "variable zero" had to be overcome and some effective means of curbing and controlling the motion of the suspended coil of the relay had to be found.

The variability of zero, which, unless special means are provided for its elimination, always occurs in cable signals when receiving condensers are employed, is of little or no importance if the siphon recorder is used as the receiving instrument, but is fatal to the working of a relay of any form.

In the first experiments over the Gibraltar-Porthcurnow cable of the Eastern Telegraph Company, the variability was overcome by placing a high resistance shunt across the receiving and transmitting condensers, but this method was not found quite practical, owing to the fact that earth-currents were not entirely excluded by the shunted condensers. The consequence was that the earth-current temporarily upset the adjustment of the relay, and this mode of working was objected to by the company. For this reason another method, which in practice has been found entirely satisfactory, was devised for compensating the effects of variable zero.

The second difficulty, the want of curbing and controlling action on the suspended coil, was overcome by the employment of a special design of magnetic shunt coupled in parallel with the relay coil.

The combination gives an apparatus as sensitive and as rapid in its action as the siphon recorder, but, unlike that instrument, able to control a comparatively large external power, by means of which signals can be transmitted to a

second cable, or paper strip can be punched by an automatic perforator, as found expedient.

On short cables hand sending is quite possible with the apparatus already referred to, but it is here assumed that at the originating station an automatic transmitter is employed.

It may be well to call attention to the fact that, when a cable is worked at its highest practicable speed, many of the originating impulses are obliterated from the received signals whenever successive impulses of the same polarity occur. It is therefore evident that, if the impulses sent by the relay apparatus into the second cable are to

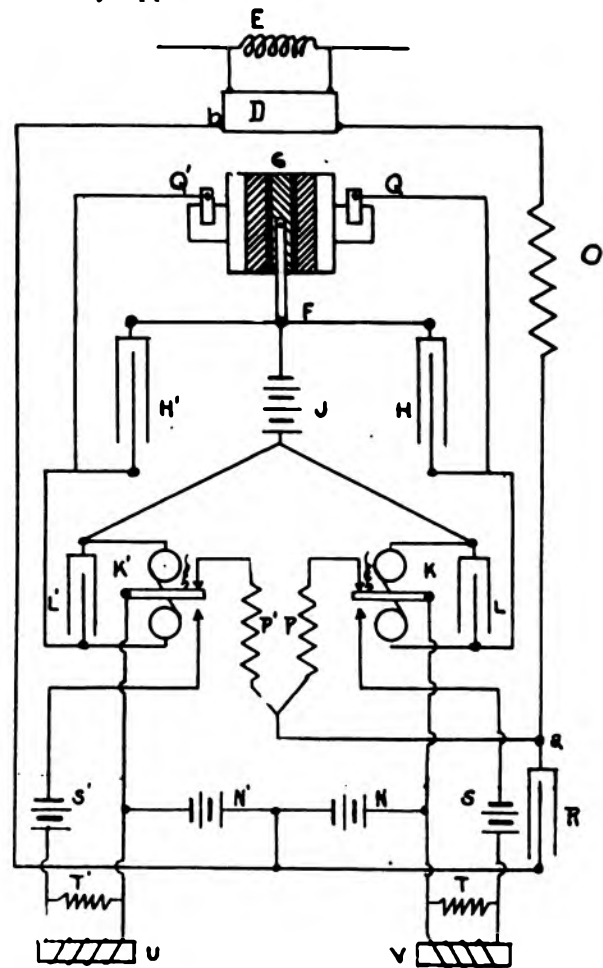


FIGURE I.

be identical in character with those sent into the first, it is necessary to reproduce the missing beats.

The instrument used for this purpose is called the "interpolator," and its action resembles that of the automatic transmitter at the originating station, with this difference, that the movements of the transmitting levers, instead of being governed by the perforations in the punched tape or strip, are governed by the motions of the relay tongue. The interpolator sends into the second cable impulses similar to those entering the first cable, and these may be either curbed or plain as required. To use this instrument to the best advantage it is necessary that it should run in

approximate synchronism with the automatic transmitter at the originating station, and that the speed of the last-named instrument should be nearly uniform.

The perforator, when used, reproduces on punched tape a fac-simile of the message on the punched tape used at the originating station, and the copy is immediately available for sending on by the usual automatic transmitter. By the use of the auto-perforator it is possible for a single short cable to feed two long ones, and vice versa, with a minimum of delay.

Referring to Figure 1, the operation and construction of the apparatus is as follows: A coil, D, similar to that of the ordinary siphon recorder, is suspended between the poles of a magnet. The received current passing through the coil causes it to move, and the movement is communicated by means of two silk fibers to the conducting tongue or pointer, F, of the relay. One end of the tongue is connected to a small battery, J; the other end rests very lightly on a drum, G, which is kept revolving at about one hundred and fifty revolutions per minute. This drum is made in three parts; the two outside ones being the dot and dash marking contacts, and the middle one, upon which the pointer normally rests when no current passes, being insulated.

When the tongue is deflected by a movement of the coil to form, say, a dot, a circuit is made through the battery J, the tongue F, and one of two relays K. A movement of the tongue in the opposite direction would close the circuit of the other relay K'. These relays are connected, as shown in the diagram, to separate batteries, S and S', and to the electromagnets U and V, which operate the catches of the interpolator. When either of these two electromagnets is energized it releases its catch and permits the interpolator to work in the same way as an automatic transmitter and send a current, of the same sense as that which actuated the coil D into a second cable. An automatic perforator may be used instead of the interpolator. This punches the arriving signals on a slip, which can then be run through the ordinary automatic transmitters for despatch upon a second or third section of cable.

Two condensers, H, H', of two microfarads each, are placed as shunts across the brushes Q, Q' of the drum and tongue F. These condensers almost entirely eliminate sparking between the tongue and the drum and thus help to maintain the surface of the drum in condition for good electrical contact.

N and N' are the halves of a battery of from seven to thirty volts and P and P' are resistances which are kept equal and are adjustable from zero to one hundred thousand ohms. O is a resistance, adjustable from zero to one hundred thousand ohms, in series with the local correction coil, which is a second winding of the coil D. R is a condenser of from sixteen to sixty microfarads capacity shunting the local correction coil and the resistance O. When the two relays K, K'

are not operated a current from the whole battery N and N' traverses P and P' and the tongues of the two relays. As the points a and b are midway between equal resistances and potentials no current flows through the coil D. When a dot is received on the drum relay the relay K operates, breaking the circuit of the half battery N and causing the current from the half battery N' to flow through the resistance P' and the coil D in the same direction as the dot current that was the primary cause of the operation of the relay.

The resistances and condensers of the local correction circuit must be so adjusted that, as the current in the main coil decreases owing to the choking action of the condensers in circuit with the cable, the local correction current increases. The effect of the condenser R is to modify the current through the coil. The larger P, P', R and O the slower will the local correction current be in attaining its maximum.

An electromagnetic shunt, E, of about thirty ohms resistance is joined across the terminals of the main coil D, instead of the usual non-inductive shunts of the siphon recorder. This exercises a great controlling and curbing effect upon the coil, modifying and squaring the signals. The interpolator consists of two distinct mechanical and electrical devices, one for sending dots and one for sending dashes. When an h is received from a long cable on the drum the tongue remains in contact with the dot side throughout the whole four beats of the letter, simply producing one long contact on the dot relay. This long signal is split up by the interpolator and transmitted as four dots.

French Letter Telegrams.

The innovation in the French postal service recently referred to in these columns was inaugurated on December 7, when from certain offices in France and Corsica, letter telegrams paid in advance were transmitted by wire during the night at the rate of 1 centime (1-5 of a cent) a word. No messages are forwarded at a charge of less than 50 centimes (10 cents). The messages are sent out as mail matter by the early deliveries.

Although telegrams are only forwarded during the night after 9 o'clock, they may be deposited after seven in the evening, and at the designated offices, which are open until midnight, up to 11 o'clock. They are received up to midnight at offices which are open all night.

The letter telegram is an experiment, and its continuation will depend upon the extent the public avails itself of this opportunity.

The under-secretary of the posts and telegraphs has published the following statistics of the use made of this service from its inauguration to December 31, which indicate a patronage that promises that the service will be made a permanent one: Number of letters-telegram sent, 6,657; number of words, 353,414; average of words in each letter-telegram, 55.

LETTERS FROM OUR AGENTS.

LOS ANGELES, CAL., POSTAL.

H. J. Thompson has been appointed assistant chief operator of this office.

S. L. Griffin is back at work, after a short illness with the grippe.

Among the late additions to the force are: C. C. Hollenbeck, E. G. Walther, M. O. McAllen and M. Vaughan.

E. A. Burns has resigned on account of ill-health.

Glenn Hancock is in temporary charge of the Central Avenue branch office.

This company has opened a new branch office at Tenth and Main streets in the automobile section. This office is in charge of Miss Beckwith and is doing a good business.

DULUTH, MINN., WESTERN UNION.

W. H. Meacham, formerly of the overland division in the Chicago office, has been appointed to the position of night chief operator in this city.

A. R. McAuley, who has worked the Duluth-New York circuit for the past year, has resigned from the service to accept a position with a brokerage firm.

E. E. Beebe, of our Board of Trade, Chicago circuit, whose resignation was announced recently, has launched a weekly paper, which he calls "Mining Stock News." It covers the field of copper stocks, especially those quoted on the Duluth curb.

Charles Stites, formerly of Minneapolis, has accepted the position of chief operator for Piper, Johnson and Case Company, brokers.

Fred Hall, manager of the branch office in the Spalding Hotel, has resigned, and accepted a position as general agent for the Great Northern Railway at Superior, Wis.

Manager C. A. Crane has succeeded in placing fifteen self-winding clocks in the new four million dollar courthouse of St. Louis County, which has just been completed. Duluth has, it is claimed, more of these clocks installed than any other city of its size in the country.

CHICAGO, WESTERN UNION.

Several important changes have occurred in this office, as follows:

W. H. Meacham has resigned to accept a position with this company at Duluth.

Harry E. Hearne is now assisting Hiram Hanchett in the overland.

J. J. Welch has been appointed traffic chief, and C. H. Shell, assistant traffic chief of this office.

S. H. Nolly is now in charge of the St. Paul division, and C. D. McDermot is the assistant.

A. C. Garrison is in charge of the St. Louis division, vice H. C. Allison, transferred to the night force.

At the annual meeting of the Aid Society the following officers were elected for the ensuing

year: E. S. Williams, president; F. L. Donaldson, vice-president; C. R. Copeland, secretary, and J. W. Koenigsmark, treasurer.

At the annual meeting of the Boosters Society, Geo. E. Dunning and C. R. Copeland were re-elected to the executive committee, and A. J. Fuller re-elected secretary.

J. B. Stemm, of the Burlington, was a recent visitor at this office.

Benjamin D. Earhart, who worked the New York cable wire here for many years, died recently.

THE ASSOCIATED PRESS.

Harry L. Beach, news editor of the Chicago bureau, has been appointed superintendent of the central division, with headquarters at that place, to succeed Addison C. Thomas, who resigned on account of ill-health. Mr. Thomas had been in charge of the leased wire service of the Associated Press for over twenty-five years.

OTHER NEW YORK NEWS.

Mr. Alexander Crow, claim agent for the Baltimore and Ohio Railroad Company, Youngstown, O., formerly and for many years identified with the telegraph service in New York, was a recent visitor. He came on business in connection with the railroad service.

Assessments Nos. 490 and 491 have been levied by the Telegraphers' Mutual Benefit Association to meet the claims arising from the deaths of David J. Willis, at New York; William A. Bunting, at Ann Arbor, Mich.; Albert C. Stebbins, at Waterville, N. Y.; John A. Anderson, at Marion, Ind.; Frank E. Cass, at Denver, Col.; James E. Pettit, at Oak Park, Ill.; Charles F. Henley, at West Easton, Pa.; Grant Demuth, at Louisville, Ky., and Alvin S. Brown, at Buffalo, N. Y.

One way to discover the whereabouts of missing persons is to publish a notice of their death. If they are not dead they will be quite sure to see the notice to that effect. As an illustration of this, in the article on "The Military Telegrapher in the Civil War," in our issue of March 16, we announced that Frank Benner, whose military telegraphic history appeared in that number, died many years ago, supposing such to be the case, as he had not been heard from for a long time by his military comrades, and search by some of them had failed to reveal any trace of him. A few days after the paper had made its appearance we were very gratefully surprised to receive a letter from Mr. Benner, stating that he is very much alive and has been cashier for the Postal Telegraph-Cable Company at Pittsburg for several years. This will be welcome news to the members of the society of the United States Military Telegraph Corps, who are reluctant observers of their rapidly diminishing ranks. Even the addition of one name to the list is a cause for pleasure to the few surviving members of this estimable society.

PHILADELPHIA, POSTAL.

Recent additions to the force in this office include D. R. Mitchell, J. C. Gallagher and J. L. Hockery.

Miss Mabel Roberts, receiver at the main office, has resigned. She will be married on April 17.

Business Notice.

On another page of this issue will be found the advertisement of Thomas J. Dunn and Company, of 1 Broadway, New York, offering for sale to members of the telegraphic fraternity the Dunn peerless transmitting key. It is the invention of Thomas J. Dunn, one of New York's well-known members of the profession, who has had a long and extended experience in the production of automatic transmitting devices. Being a practical telegrapher himself, he realizes what the requirements are, and his mechanical and inventive ability enables him to furnish an instrument that will do the work for which it is constructed. The instrument is compact, can conveniently be carried in the pocket, and when in circuit sends natural, clean-cut dots at any rate of speed with an up and down motion like the Morse key. Automatic dot-making devices have proven a great boon to the profession, and this instrument, it is claimed, fills every demand made upon it for accurate and fast service. The price of the transmitter is \$8.00. Descriptive booklet will be mailed upon application to Messrs. Dunn and Company.

People's Mutual Telegraph Company Secures Franchise.

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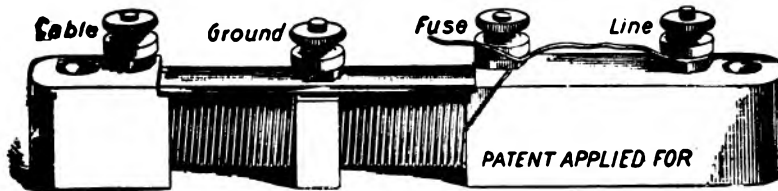
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No. 8.

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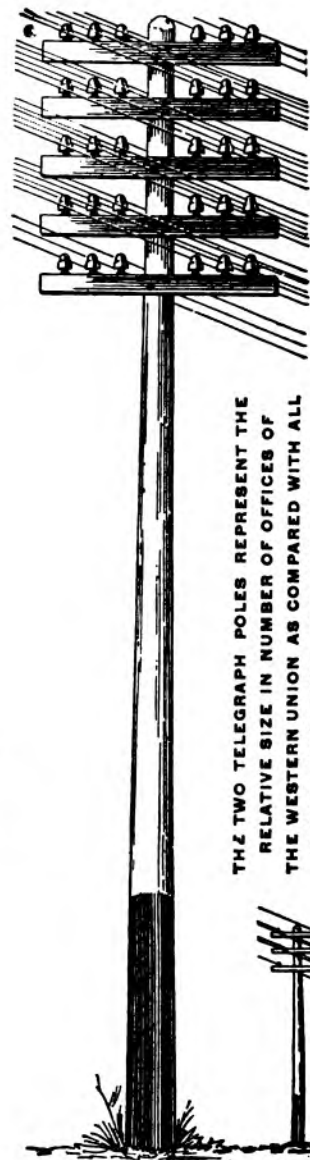
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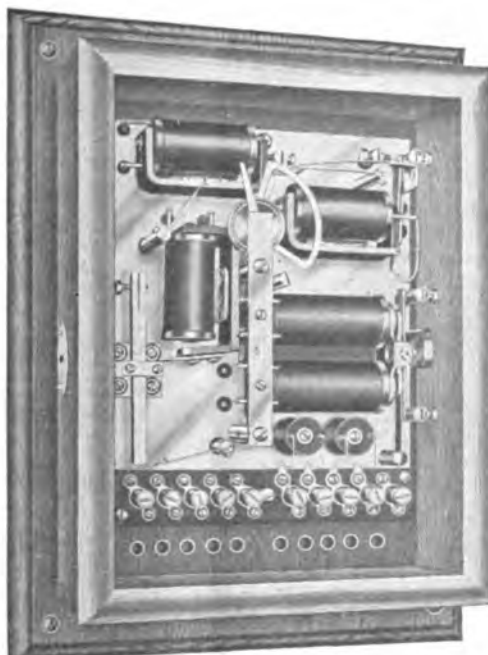
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The diagrams appearing in "Official Diagrams of the Postal Telegraph-Cable Company's Apparatus and Rules Governing the Construction and Repair of Lines" were made from the company's blueprints and are absolutely correct. This volume, which is published by Telegraph Age, under official sanction and supervision, is of especial value to operators and linemen. It will be sent to anyone, postpaid, on receipt of fifty cents.

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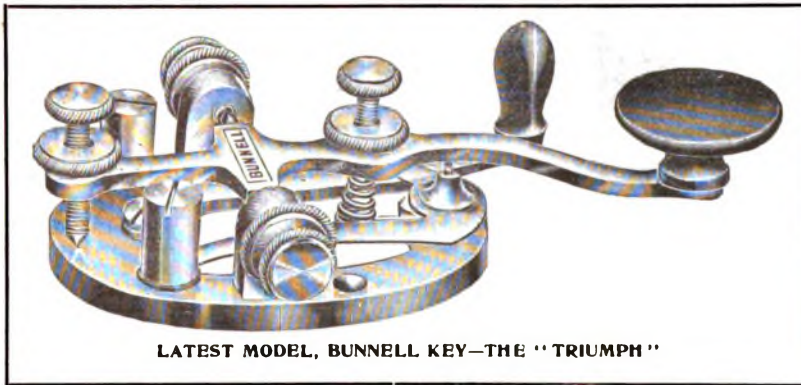
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No. 8.

NEW YORK, APRIL 16, 1909.

Twenty-sixth Year.

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SOME POINTS ON ELECTRICITY.

BY WILLIS H. JONES.

The Telephone.

PART II.

In the preceding instalment of this article it was shown that the simple telephone consists of what are now designated as the receivers, one at each end of the circuit. It was also shown that these instruments originally acted in the capacity of either receiver or transmitter, as the occasion demanded.

So far as this apparatus alone is concerned there have been practically no changes made in their construction or operation, but many other alterations have been effected in the complete telephone outfit, in the way of accessories and arrangement of circuits, for the purpose of giving the receiver a greater efficiency.

These are the important points which the student should look into so as to understand just why better results are thus obtained. If one understands why a certain thing is done in a given case, the knowledge is always helpful in every case where a similar electrical effect is desired, whether it be in a telephone, telegraph or other circuit.

Thus in seeking a means of increasing the volume of current and the distance within which conversation may be exchanged over a wire, the following facts suggested a solution of the problem:

In a magneto telephone the volume and intensity of the "induced" or speaking current which goes out over the line depends upon the number of magnetic lines of force flowing through the steel core and the percentage thereof, which are altered by the to and fro movement of the vibrating diaphragm, the said alterations being due to the alternate shortening and lengthening of the magnetic circuit.

Obviously the total number of lines circulating in such a magnet that it is possible to alter is comparatively small, while the range between maximum and minimum density which occurs is likewise not very great. Hence the effect produced in the line is correspondingly feeble. But we can easily increase the number of magnetic lines circulating through the magnet by including the primary of an induction coil consisting of a few turns of wire wound on an iron core in the circuit, and then causing a strong current from a few cells of local battery to flow through this circuit. Also by

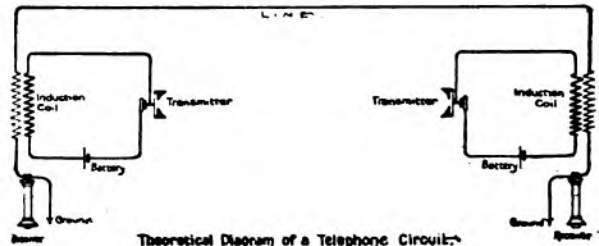


FIGURE 1.

means of a somewhat differently constructed diaphragm wider degrees of fluctuation in the magnetic density may be obtained.

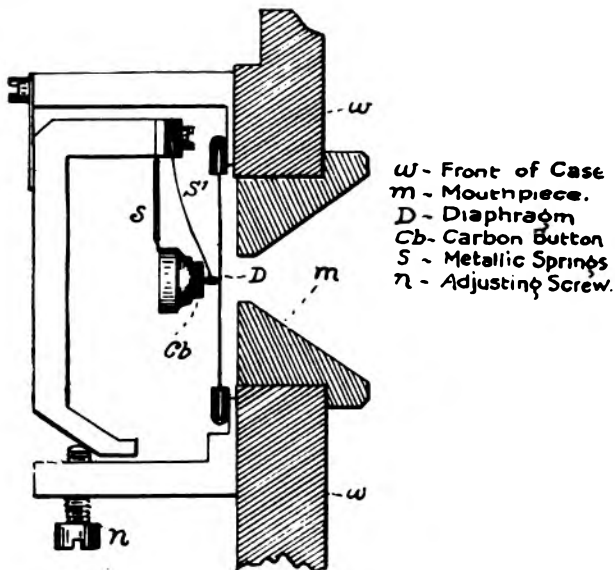
For this reason a separate telephone, consisting of a mouthpiece, diaphragm, primary and secondary coil, together with a few cells of local battery, is used as the transmitting apparatus, while the ordinary telephone serves as a receiver only.

The accompanying diagram, Figure 1, shows the arrangement and connection of the extra telephone or transmitter. It will be seen that the local battery is short-circuited through the mouthpiece and the primary winding of an induction coil, the secondary winding of which is represented by the finer parallel wave-like lines. It will also be seen that this secondary winding is in series with the main line and therefore must act in the same capacity as the coil of the original telephone itself

did when that instrument was used as a transmitter.

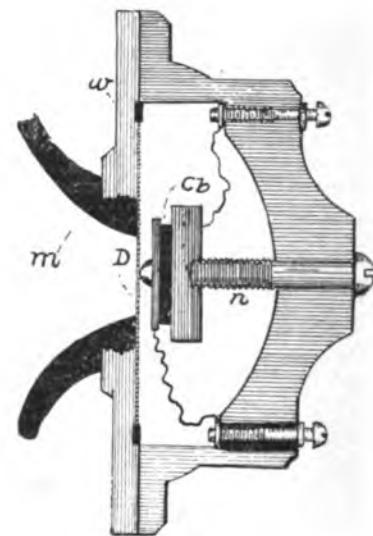
Now greater degrees of magnetic fluctuations are

actual practice, however, this is seldom done, for the reason that connection with the earth causes the telephone to pick up foreign noises from adja-



The Blake Carbon Transmitter.

FIGURE 2.



The Edison Carbon Transmitter.

FIGURE 3.

obtained by this arrangement for several reasons. First, because the portion of the local circuit included in the transmitter is made up in part of a material which, under the influence of variation in the pressure exerted upon it by the diaphragm, is subject to wide ranges of variation in resistance. For this material carbon in a granulated or compressed form has been found most satisfactory, and in one form or other it constitutes the variable resistance in the local circuit of all modern telephone transmitters in use to-day.

Another reason why greater variations are possible with this method is that, as the normal resistance of the local circuit is small, any alteration that does occur when the carbon is affected is naturally much greater in ratio than would be the case were the carbon in series with the resistance of the main line circuit. The result is that when such changes take place in the local circuit, the secondary coil is capable of sending correspondingly greater induced currents over the line than in the case of the receiver first described.

Figures 2 and 3 show the construction of the Blake and the Edison telephone transmitters, in which it will be seen that the variable resistance is created by different degrees of mechanical pressure brought to bear on the carbon button or filling during the vibrations of the diaphragm when one speaks into the mouthpiece. There are many other types of transmitters in use, of which the "solid-back" pattern is probably the most generally used for long-distance purposes, but carbon in some form is always used in the primary circuit.

In the illustrations shown the terminals of the main line are represented as being grounded. In

cent sources. Hence metallic circuits are preferable.

(To be continued.)

Recent Telegraph Patents.

A patent, No. 916,727, for a telegraph key has been awarded to R. L. Leaf of Alhambra, Ill. Does away with the shiftable bar which makes and breaks the connections and avoids the failure to close the circuit when the message has been transmitted. The circuit is automatically completed when the operator releases the button by means of an arm located over the key bar which is let go when the key is released.

A patent, No. 915,154, for a telautograph has been issued to E. Belin, of Paris, France. For reproducing at a distance an original photograph by means of another photograph which is a copy of the first. The transmitter carries a surface slightly in relief, the variations in the relief being translated into variations of electric intensity which are then transformed to a distance and retransformed into variations of light intensity which are subsequently recorded.

A patent, No. 916,538, for a telegraph key has been taken out by F. William De Tray of Aurora, Ill. Provides a separate mechanism so that the part producing the dots cannot produce the dashes, thus reducing mistakes. A swinging lever is used with a second contact element having a pivotal mounting on the actuating lever and a stationary bearing for the second element that effects its swinging movement on the lever when said lever is operated.

A patent, No. 915,330, for an insulator and wire clamp has been granted to J. Blackburn, of St. Louis, Mo. Particularly for cross-arms and adapted to hold a wire without the use of tie wires. The body is of insulating material, in the upper portion of which is formed a V-shaped notch which follows a compound curve across the insulator.

Municipal Electricians.

A meeting of the executive committee of the International Association of Municipal Electricians took place at Atlantic City, N. J., March 26 and 27. It was decided to hold the annual convention of the association on September 14, 15 and 16, the headquarters to be at Young's Hotel, on the corner of Tennessee avenue and the Boardwalk, Atlantic City. A full attendance is requested, as there is considerable important business in the hands of the secretary which ought to receive proper consideration before being finally disposed of.

Mr. J. B. Yeakle, superintendent of fire telegraphs, of Baltimore, Md., is the president of the association, and the secretary is Frank P. Foster, of Corning, N. Y., to whom all matters of interest to the association should be addressed. Mr. A. C. Farrand, city electrician of Atlantic City, is chairman of the committee of arrangements. It is unnecessary to state that this gentleman understands how best to provide social recreation to fill in the intervening hours between the adjournments and reassembling of the convention. Those who were fortunate in being present at the previous convention which was held at this popular watering resort well remember Mr. Farrand's successful efforts as chairman of the entertainment committee, which resulted in everyone expressing himself as being much pleased with the splendid reception accorded to all.

An arc lamp located two miles distant from a certain wireless telegraph station reproduces, it is observed, the Morse signals transmitted in a readable manner.

A patent, No. 916,142, for a combined fire-alarm telegraph and telephone system has been awarded to M. Garl, Akron, O. A series of alarm boxes, a normally closed line circuit and a normally broken ground circuit, with means for cutting a telephone into the line circuit at each of the boxes, and means for placing the telephone at the central in a separate circuit with the alarm-box poles and simultaneously breaking the line circuit.

Personal.

Mr. Robert Morton, manager of the Eastern division of the Telepost Company, Boston, Mass., and a well-known former New York telegrapher, was a recent visitor, and while in town called on many of his former old friends.

The Swedish Academy of Science, on April 1, conferred a gold medal upon Thomas A. Edison for his invention and development of the phonograph. Crown Prince Gustavus Adolphus handed the medal to Mr. Graves, the American Minister.

Mr. G. H. Corse, Jr., for many years identified with the telegraph, but now and for the past three years, of Shanghai, China, is visiting relatives and friends in New York. He will return to China within the next month. Mr. Corse is general Oriental agent of the Chicago, Milwaukee and Puget Sound Railway.

Mr. E. C. Bradley, vice-president and general manager of the Pacific Telephone and Telegraph Company, San Francisco, Cal., and for many years previous to three years ago vice-president of the Postal Telegraph-Cable Company, New York, was a recent city visitor, coming here on business connected with the telephone service.

Mr. B. E. Sunny, president of the Chicago Telephone Company and vice-president of the General Electric Company and of the American Telephone and Telegraph Company, a former well-known Chicago telegrapher, and Mr. Charles G. Dawes, largely interested in public-utility enterprises, have been appointed members of a special commission to standardize the duties and compensation of the employes in all departments of the city of Chicago.

Colonel William Bender Wilson, special agent of the Philadelphia Terminal division of the Pennsylvania Railroad, and president of the Society of the United States Military Telegraph Corps, having reached the pensionable age, will be retired on May 1 by the Pennsylvania Railroad Company, with which interests he had been identified since 1855. The time he served in the United States military telegraph service, first as manager of the telegraph office in the War Department at Washington, and later as telegraph scout, is all credited to him as continuous service by the railroad company, as he was furloughed to perform that duty. His railroad service therefore covers a period of fifty-three years and six months.

Western Union Telegraph Company.

EXECUTIVE OFFICES.

Mr. Thomas F. Clark, vice-president of the company, who has just recovered from typhoid fever, accompanied by his wife, sailed for Naples, Italy, on the steamer Cretic, April 3, to be absent about two months.

Mr. H. E. Roberts, superintendent of supplies, has gone on an extended business trip through the West, in the interest of his department, which may take him as far as the Pacific Coast.

The supply department of the company has been removed from its temporary quarters, 14 Dey street, in the rear of 195 Broadway, to 152 Franklin street, where it was located previous to the fire of three months ago, which destroyed the interior of the structure.

Mr. Ralph E. Bristol, storekeeper of the supply department, and son of Charles H. Bristol, general superintendent of construction of the company, has resigned to engage in other business, and will reside hereafter in the West.

Mr. Fred J. Dayman, for the past twenty-five years night chief operator of the Detroit, Michigan, office, has been advanced to the position of chief operator of the Cleveland, Ohio, office, vice W. C. Wood, resigned to enter other business.

Mr. Stephen D. Field, the electrical engineer and inventor, of Stockbridge, Mass., recently inspected the Barclay department, accompanied by the inventor of the system, Mr. John C. Barclay. Mr. Field, after his observing and critical eyes had taken in the full significance of the wonderful work of this printing system, stated that he never could have believed such remarkable results possible in the use of machine telegraphy.

The American District Telegraph Company of New Jersey in its report for the year ended December 31, 1908, shows a surplus of \$387,793, after payment of \$398,088 in dividends. Increases are noted in gross earnings, net earnings, dividends and surplus. The total profit and loss surplus is now \$1,632,737.

W. B. Powell, General Inspector of the Southern Division.

Wilbur B. Powell, lately appointed general inspector of the Southern Division of the Western Union Telegraph Company, is another example of the young man forging to the front, by reason of duty well performed. Mr. Powell is a Tennessean by birth, having been born at Winchester in that



W. B. POWELL,
General Inspector, Western Union Telegraph Company,
Atlanta, Ga.

state March 28, 1878. He first entered the telegraph service in 1894 at the University of the South, Sewance, Tenn., and in 1895 entered the employ of the Southern Railway, serving with them for three years at Chattanooga, Atlanta, Washington and Birmingham. He then went with the Postal Telegraph-Cable Company at St. Louis, and remained with them until he entered the service of the Western Union Telegraph Company at Denver, Col., in 1900. After being at that point about

two years he was transferred to the Philadelphia office of the company, where he remained for four years, until August, 1906, working in various departments and gaining much valuable knowledge. From August, 1906, to October, 1907, he was employed in the New York office of the company and also by a brokerage firm. He was next made chief operator of the Savannah, Ga., office, but remained there only until December of the same year, when he was made manager at Macon, Ga., which office he held at the time of his advancement to the general inspectorship, which took effect February 10.

Canadian Pacific Appointments.

Owing to the death, on March 22, of Mr. P. W. Snider, superintendent of the Canadian Pacific Railway Company's Telegraphs, at St. John, N. B., the following changes have taken place: Mr. F. J. Mahon has succeeded Mr. Snider as superintendent of the Atlantic division, with headquarters at St. John, N. B.; Mr. J. F. N. Caisse succeeds Mr. Mahon as inspector of the Eastern division, with headquarters at Montreal; Mr. J. Mitchell becomes chief operator of the Montreal main office; Mr. A. M. Bennie, night chief operator; Mr. A. Malcolm, traffic chief, and Mr. O. J. Roberge, assistant chief operator at the general offices, Windsor street station. Engravings and biographical sketches of Messrs. Mahon and Caisse appeared in our October 1, 1908, issue.

Postal Telegraph-Cable Company.

EXECUTIVE OFFICES.

Mr. Edward J. Nally, vice-president and general manager of the company, was in Chicago on April 1 on business connected with the service.

Mr. F. E. d'Humy, assistant electrical engineer, is rearranging the office at Providence, R. I., with the object of providing additional room to take care of the needed increased facilities.

Mr. Welcome I. Capen, of Chicago, general superintendent of the Western division, has been appointed general superintendent of plant, with headquarters at New York. The growth of the company's business necessitated relieving the vice-presidents of the supervision of construction of lines, and it was decided to turn this work over to a general superintendent of plant. Mr. Capen is the first holder of this newly created office.

Mr. Thomas W. Carroll, of Chicago, division superintendent, has been advanced to the position of general superintendent of the Western division, vice W. I. Capen. Mr. Frederick W. Conger, of Chicago, city superintendent, has been promoted to fill the position of division superintendent, vice Thomas W. Carroll. Mr. Hiram G. McGill, superintendent of the sixth district, has had the city of Chicago added to the territory over which he presides.

A new main office, modern in every particular, has been installed at Allentown, Pa. Mr. Charles O. Stager is the manager.

Mr. Wilfred A. Gauvin, of Lewiston, Me., has been appointed manager of the Biddeford, Me., office, vice Lester A. Hanson, deceased.

Plans are being prepared for a fine new office at Salt Lake City.

The Postal Club, composed of employes of this company in New York and Brooklyn, held its eighth annual dinner at the Imperial, Brooklyn, N. Y., on Saturday evening, March 27. The dinner was marked by the largest gathering of members in the history of the club, one hundred and fifty, being present, and good fellowship was supreme. Mr. Thomas E. Heffren, president of the club, acted as toastmaster, and in his opening remarks thanked the members for their earnest work in bringing the organization to its present high standing. Complimentary letters and telegrams were received from E. J. Nally, vice-president and general manager; C. C. Adams, vice-president; E. Reynolds, auditor; E. B. Pillsbury, general superintendent; Isaac Smith, superintendent of tariffs; C. F. Leonard, district superintendent, and W. C. Daviet, of Atlanta, Ga. The speakers included Thomas J. Donovan, G. W. Fleming and John F. McNeill. The officers of the club are: Thomas E. Heffren, president; John F. McNeill, vice-president; M. F. Geigle, secretary; F. J. Kernan, treasurer.

In the Postal Telegraph for April an engraving of Colonel Albert B. Chandler, chairman of the board of directors, is shown. Under the picture is a note signed W. W. C. The author, Mr. W. W. Cook, general counsel of the company, pays Colonel Chandler the following tribute:

"Albert B. Chandler was born in Randolph, Vt., on August 20, 1840. He was one of President Lincoln's confidential telegraph operators during the terrible times of the Civil War. In the early eighties the Bankers' and Merchants' and the American Rapid Telegraph Companies were wrecks, and the Western Union supreme. At that time he was invited by the late John W. Mackay to construct a competing telegraph system in connection with his Atlantic cables. Mr. Chandler did so in the face of apparently insurmountable difficulties. It was then, and during subsequent years, that I was associated with him and knew him as a man of infinite patience and pains, which, with his sterling New England qualities of honesty and steadfastness and thorough mastery of his work, enabled him to weave a network of telegraphs throughout the country. When he withdrew from active management a few years ago, he had the gratification of knowing that he was the only man who had ever built a comprehensive and successful competitive system of telegraphs in the United States."

President Clarence H. Mackay, because of his well-known interest in the service, and desiring that its offices shall at all times appear well and be well conducted, and with the view of stimulating its managers to make extra efforts to accomplish this and to improve the service in every way, as well as to obtain gratifying results in re-

ceipts and expenses, has personally offered a series of annual prizes beginning with the year 1909, to be known as the President's Prizes, and to be arranged as follows: Four of the first class, \$250 each; eight of the second class, \$100 each; eight of the third class, \$50 each, and twelve of \$25 each. One first class prize, two second class prizes and two third class prizes will be awarded to managers in each of the four divisions, Eastern, Western, Southern and Pacific. Three \$25 prizes will be awarded to deserving messenger boys in each division. These prizes will be divided as the superintendent decides.

The managers' prizes will be awarded on the recommendation of the respective general superintendents and superintendents for: The percentage of increased net receipts as compared with previous year (actual percentage to represent the number of points); the condition of books and office accounts, a credit or debit of three points; the average percentage of collections to gross receipts, as shown by the auditor's books at the time they are closed each month, when fifty per cent. or more, one point; when seventy-five per cent. or more, three points; when less than fifty per cent. a debit of one point; when twenty-five per cent. or less, a debit of three points, for an average delay of messages from wire to customer and from customer to wire of eleven minutes or less, a credit of three points, and for an average of greater than eleven minutes, a debit of three points; appearance and cleanliness of office, a credit or debit of three points. Debits will be deducted from credits and prizes will be awarded on the results.

Prizes for messengers will be awarded on the following basis: greatest number of messages delivered, twenty-five points; greatest number of messages brought in, twenty-five points; behavior, a maximum of thirty points; appearance, a maximum of twenty points, making a possible total of one hundred points.

WELCOME I. CAPEN BECOMES GENERAL SUPERINTENDENT OF PLANT.

Mr. Welcome I. Capen, general superintendent of the Western division of the Postal Telegraph-Cable Company, with headquarters at Chicago, who has just been transferred to New York to occupy the newly-created position of general superintendent of plant, will bring with him to the metropolis from the west a ripe experience and a well-balanced judgment that admirably fit him to faithfully execute the duties of his new office, which consist in the supervision of construction of lines. Mr. Capen was born at Brattleboro, Vt., July 25, 1854. He has been in the telegraph service all of his business life, his record beginning as a messenger boy at ten years of age, in his native place, with the Vermont, Boston and Montreal Telegraph Company. Later he became an operator for the same company, afterward entering the employ of the Western Union, and in turn serving many of the old opposition com-

panies, eventually reaching the managership of the Automatic Telegraph Company at Baltimore, retiring therefrom when this company passed under the control of the Atlantic and Pacific. Subsequently he served the Western Union at Cincinnati, as wire chief, resigning to accept the managership of the Baltimore and Ohio office in that city. His appointment as manager of the Postal Telegraph-Cable Company at Cincinnati began



WELCOME I. CAPEN,
General Superintendent of Plant, Postal Telegraph-Cable Company,
New York.

his connection with that company. His abilities were early recognized, and from Cincinnati he went to Indianapolis, there to become a superintendent of his company. His call to the superintendency at Chicago followed, from which his promotion to the office of general superintendent was a natural sequence, when his predecessor, Mr. Edward J. Nally, was promoted and transferred to New York, on October 1, 1906, as a vice-president of the company.

THOMAS W. CARROLL ADVANCED TO THE GENERAL SUPERINTENDENCY OF THE WESTERN DIVISION.

Mr. Thomas W. Carroll, of Chicago, who has just been advanced from the position of division superintendent to occupy the general superintendency of the Western division, to fill the vacancy caused by the transfer of Mr. W. I. Capen, to New York, has reached the highest divisional position within the gift of his employing company. Mr. Carroll is well qualified to fill the duties of his new office. He is one of the youngest members in the service to reach such a high position. He was born at Cleveland, O., January 22, 1871, and became a member of the Postal force in that city in 1888. His subsequent record as an operator, both at Cleveland and Pittsburg, was full of promise, and speedily paved the way for his being promoted to the place of repeater chief in the overland service at Albuquerque, N. M., followed by that of day chief operator at Denver.

In the meantime, his electrical training had not been neglected, and proficiency acquired in this particular led to his being transferred to New York, where he was given the post of an electri-



THOMAS W. CARROLL,
General Superintendent, Postal Telegraph-Cable Company,
Chicago.

cian in the electrical department of the Postal's home office. Receiving the appointment of assistant electrical engineer at the Chicago office, he filled that situation from April, 1901, to October 1, 1906, when he was elevated to a superintendency. On January 1, 1908, he was further advanced to the position of division superintendent, which place he now relinquishes to accept the highest position in the Western division, and those who know him are confident that the same intelligent purpose will guide his action in his new duties as it did in the subordinate places which he previously occupied.

FREDERICK W. CONGER SUCCEEDS THOMAS W. CARROLL AS DIVISION SUPERINTENDENT.

Mr. Frederick W. Conger, of Chicago, who has recently been advanced from the position of district superintendent to that of division superintendent, to succeed Thomas W. Carroll, takes to that office a lifelong and valuable experience in the telegraph service, which renders him well qualified to discharge the duties of his new position. Mr. Conger was born at Phoenix, N. Y., in 1855. He learned telegraphy on the Chicago and Northwestern Railroad in 1874, and entered the service of that company as night operator at Westside, Iowa. After serving as extra station agent and operator at nearly all stations between Boone and Council Bluffs for about two years, he became superintendent of telegraph of the Sioux City and Pacific Railroad. In October, 1878, he left this position and became train despatcher on the Chicago division of the Illinois Central. In July, 1886, he was made chief clerk of the telegraph department of that system, which position

he held until he entered the employ of the Postal Telegraph-Cable Company as clerk in the Chicago office in 1893. He was subsequently appointed chief clerk in the general superintendent's office in Chicago, and in 1899 became superintendent

managership in that city. On January 1, 1904, he was again promoted and became district superintendent of what was then known as the ninth district, with headquarters at Milwaukee. He re-



FREDERICK W. CONGER,
Division Superintendent, Postal Telegraph-Cable Company,
Chicago.



HIRAM G. MCGILL,
District Superintendent, Postal Telegraph-Cable Company,
Chicago.

mained here until January 1, 1908, when the ninth district was merged with the first, and his headquarters were moved to Chicago.

ent of the Postal at Cincinnati, O., holding this position until April, 1901, when he was advanced to the post which he now vacates.

HIRAM G. MCGILL RECEIVES ADDITIONAL TERRITORY.

Mr. Hiram Gray McGill, of Chicago, who, on April 1, had added to the territory over which he is district superintendent, the city of Chicago, including the main as well as all branch offices, is widely known among the telegraph fraternity, and his many friends will congratulate him upon this addition to the responsibility of his position. Mr. McGill was born in Urbana, Ohio, on January 28, 1861, and entered the telegraph service in 1875, when he became a messenger for the Western Union Telegraph Company in his native town. He afterward became an operator for the Atlantic and Pacific Telegraph Company at Richmond, Ind., but in 1878 he again entered the employ of the Western Union as operator at Chicago. He remained here until 1883, when he became operator for the Postal Telegraph-Cable Company at the same place. He was soon promoted to be night manager, and in 1893 was manager of his company's interests at the World's Fair Grounds, Chicago. At the close of the exposition he became Eastern wire chief, which position he held until April of the following year, when he was sent to Milwaukee to take the

The Cable.

Cable communication is interrupted April 14 with:

- Venezuela Jan. 12, 1906
- Madura Island (Dutch East Indies) Feb. 3, 1908

Mr. James A. Scrymser, president of the Central and South American Telegraph Company, and of the Mexican Telegraph Company, has returned to his office in the very best of health, after a sojourn of two months at Bermuda, Palm Beach and Jekyll Island.

Mr. S. S. Dickinson, general superintendent of the Commercial Cable Company, New York, who has been quite sick of late, is now convalescent, but will not resume his official duties for some time to come.

Mr. J. H. Smart, formerly superintendent of the Commercial Cable Company, New York, accompanied by his wife and daughter, spent the Easter week with friends in this city.

High-Speed Signaling in Submarine Telegraphy.

Mr. Sidney G. Brown delivered a lecture on March 12 before the Royal Institution, in which he explained the workings of his submarine cable repeater, a description of which we published in our issue of April 1.

Mr. Brown also dealt with the general difficulties of submarine signaling. A core of any given length, he said, has a certain time rate of signaling, which is inversely proportional to the product

of the resistance of the wire and the electrostatic capacity of the core. This is termed the *k r*, or capacity resistance. There is a critical limit or point to give the lowest *k r*—namely, when the diameter of the copper to the diameter of the core is in the proportion of 1 to 1.65.

If two cables were constructed of equal *k r*, but one had a larger copper of half the resistance of the other, then with equal sending batteries the one with the lower resistance would deliver twice the current at the receiving end at the termination of equal times, and could, therefore, be made to work at a faster rate. Against these electrical advantages must be set the risks due to the reduction of the thickness of the cable, but such mechanical difficulties could be overcome, he thought, by greater care being taken in the manufacture of the cable or by substituting dry cotton, or similar material well impregnated with gutta percha compound, for the yielding gutta percha at present used.

Taking an Atlantic cable laid in 1894 as an example, Mr. Brown estimated that with a cable of the same diameter having the greatest size of copper electrically permissible, the speed of working duplex would be increased from 205 letters per minute to 240 letters per minute, and the current received would be twice as strong as in the actual cable.

National Electrical Code Revised.

The seventeenth annual meeting of the Underwriters' National Electric Association was held at New York March 24 and 25. The suggested changes contained in the bulletin sent out recently by the secretary, C. M. Goddard, of Boston, were acted upon. The revisions adopted at this meeting do not take effect until the amended code is ready for distribution, which will be in three or four months from the present time. The changes relate largely to installation work. The meeting was a thoroughly representative one, and the changes made in the National Electrical Code will bring the rules and regulations governing all wiring work up to a thoroughly practical standard. It has always been the endeavor of the Underwriters' National Electric Association to make only such changes in the code as are made necessary by progress in the art or such as have been shown by some field experience to be necessary to safeguard against hazard.

Señor Lacierva, Minister of the Interior at Madrid, Spain, the ministerial head of the telegraph system of that country, has introduced a bill in the Chamber of Deputies calling for a complete reorganization of the postal service in the kingdom. The bill provides for new telegraph and telephone systems which will take in 4,000 towns, reduced rates and the creation of a savings bank and a parcels post. The cost of the improvements will be \$6,000,000.

The Pittsburg Reunion of the Old Time and Military Telegraphers.

The Old Time Telegraphers' and Historical Association, through its president, Mr. Elgin B. Saylor, superintendent of the Western Union Telegraph Company at Pittsburg, Pa., is actively organizing preparatory to the coming convention, which will take place this year at Pittsburg, Pa., on August 17, 18 and 19, at the Fort Pitt Hotel. These days have been selected after careful consideration because they better meet the requirements of the majority of those who intend to be present at this reunion which will be the twenty-eighth in the series. It is expected that excursion rates may be obtainable from all points during the latter part of August, which was an important factor in the selection of the time.

President Saylor has named the following as members of the finance committee: George A. Cellar, chairman; N. E. Curch, secretary; Thomas Gosden, treasurer; F. L. Bender, R. R. Brown, G. H. Kendrick, B. F. Lloyd, Dr. Z. T. Miller, H. C. Reeser, Wm. H. Smith, J. G. Splane, Astley C. Terry, Jas. B. Yohe, Morris W. Mead, A. W. Rinehart, all of Pittsburg; J. P. Altberger, Philadelphia; F. G. Boyer, Oil City; D. Colestock, Titusville, Pa.; W. J. Dealy, New York; Wm. J. Lloyd, Chicago, and Charles Selden, Baltimore. F. J. Scherrer, 195 Broadway, New York, is the secretary of the association.

In conjunction with this gathering, the Society of the United States Military Telegraph Corps, Colonel William Bender Wilson, Philadelphia, president, and David Homer Bates, 658 Broadway, New York, secretary, will meet under unusually happy auspices. It was from Pittsburg and vicinity that the nation drew the nucleus of what was destined to become the first telegraph corps in the world ever organized for military purposes, and many of the survivors, which number less than two hundred, out of fifteen hundred, express themselves as pleased with the opportunity to "go home," so to speak.

Magnetic Club Dinner.

The Magnetic Club of New York will hold its spring meeting and dinner at the St. Denis Hotel on the evening of April 21, at 6.30 o'clock. This is the twenty-first year of the existence of the club and the committee is making unusual efforts to properly celebrate the occasion of the club's coming of age. Many good speeches and a splendid entertainment is promised.

The National Assembly of Panama has recently enacted a law authorizing the executive power to expend a sum approximating \$100,000 in the construction of telegraph lines in the republic of Panama. The law also authorizes the installation of telephone service between several of the towns and the erection of wireless telegraph stations between Colon and Bocas del Toro.

Subscribe for Telegraph Age, \$2.00 per year.

Laying of the Four Core Kerite Cable Across the Isthmus of Panama.

The cable steamer Relay, having on board forty-seven miles of Kerite cable, one and one-half inches in diameter and weighing 339 tons, for the Central and South American Telegraph Company, for use as an additional route to their present overhead system across the Isthmus of Panama connecting South American points with the United States, sailed from New York December 15 and arrived at Colon, December 26, 1908. Preliminary arrangements were made with the officials of the Panama Railroad Company, who heartily cooperated in the work of placing the cable in position, rendering valuable assistance to the engineers in charge. The cable was laid by making seven separate expeditions from Colon, the length



LAYING THE CABLE ALONG THE PANAMA RAILROAD WITH A DERRICK CRANE.

of each of the seven sections depending upon the ordinary traffic of the railroad, upon the routes to be followed and upon the means at the disposal of the engineers in charge of the work.

The following is a list of the expeditions: January 3, from Colon cable hut to Barbacoas bridge by train, twenty-two miles; January 10, from Barbacoas bridge to Gamboa switch and Obispo bank by train, nine miles; January 17, from the new cable hut at Panama to Paraiso switch by train and hauling by hand, eight and one-half miles; January 20, from Paraiso switch to Cucarcha police station, hauling by hand, eighty-five one hundredths of a mile; January 21, from Cucarcha police station to Gold Hill powder house and to Obispo powder house by train and hauling by hand, four and one-half miles; January 22, from

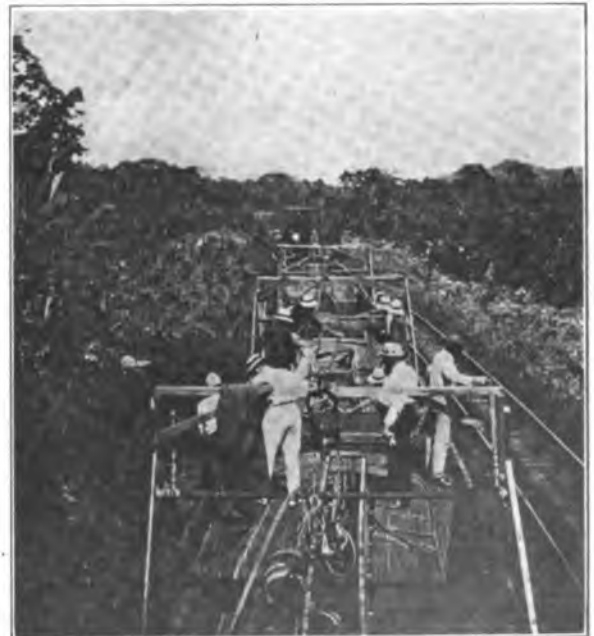
Obispo bank to Obispo powder house, one mile; January 27, from Colon office to cable hut, Fox River, by train, one mile; total length, forty-seven miles.

The laying of the cable by train was successfully carried out by using a crane car, which guided the cable during paying out above and beyond railroad cars on neighboring tracks, switches, signal houses, trees, swamps, slopes, railroad em-



LOADING THE CABLE FROM THE CABLE STEAMER RELAY TO PANAMA RAILROAD CARS.

bankments, side tracks and forty-five bridges. This method of laying the cable would have permitted the engineers in charge to have finished the work in one operation and within twenty-four hours, if the cable had followed the railroad right of way from end to end and no obstacles had been encountered enroute. As it was, however, the cable had to be carried by train and also hauled



VIEW OF LAYING THE CABLE. FIRST DAY'S RUN.

by hand on eight separate long stretches away from the railroad track.

The most difficult sections to be laid were from Gold Hill to Cucarcha police station, 4,370 feet;

from Cucarcha police station over a hill to Paraiso, 4,020 feet, and over a tunnel at Miraflores, 1,450 feet, where the cable had to be hauled by hand across stony ground and untrodden bushes under a strong tropical sun.

The cable had to deviate from the railroad now in use and had to follow the relocated railroad,

and the electrical conditions, as proved by tests, were most excellent, the resistance and capacity of the copper conductor being 382 ohms and 14.2 microfarads for each core, and the mean insulation thirty-four megohms absolute at a mean temperature of 82.5° Fahrenheit, or 8,000 megohms per mile at sixty degrees Fahrenheit for each core.



TESTING OUT THE FIRST SECTION OF TWENTY-TWO MILES.

which is still under construction, and haul by hand at many places. The excavation of the Isthmus Canal being carried out with extraordinary speed and energy, the railroad, besides its passenger and freight trains, had to handle from 250 to 300 dirt trains daily. This enormous traffic necessitated the cable laying to be carried out on Sundays along the main line and on specially selected days on the new line. Twelve splices with forty-eight

During the night of February 4 the balance for duplex working between the Panama office and Fisherman's Point, Cuba, distant about 800 miles, was successfully established, contrary to the many doubts expressed, by some experts previously to the laying of the cable. The opinion was based upon their knowledge of the tropical conditions to which the cable would be exposed when laid

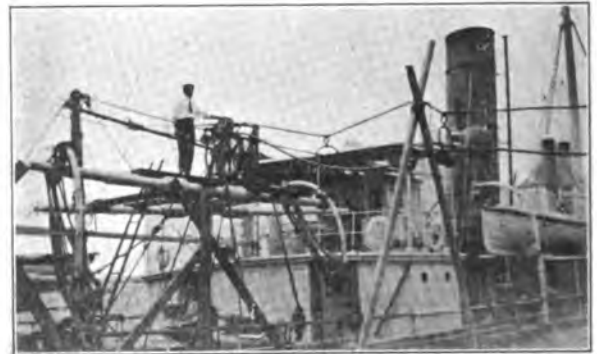


VIEW SHOWING CABLE COILED ON CARS.

joints had to be made, of which three were made between the Colon office and Fox River hut, a distance of about one mile.

The splicing of the cable was particularly difficult, those in charge of the work being obliged to carry from place to place the heavy splicing tools. Besides this the work was done either under a very hot sun or in a heavy downpour of rain.

It is gratifying to state, however, that the work of laying the cable was successfully accomplished



CABLE COMING OUT OF TANKS ON CABLE STEAMER RELAY.

above ground, instead of being entirely and constantly under water and on account of the extreme heat to which in some places it was subjected, the cable being partly on dry ground and partly passing through swamps and the many variations of temperature experienced at all times.

The employment of Kerite as insulating material overcame all the difficulties arising from the varying temperature and conditions.

The completion of this cable, the idea of which was suggested by President James A. Scrymser,

gives the company a direct and all cable route from Buenos Aires, Valparaiso and the west coast of South America to the United States and Europe via Colon and Cuba.

As the cable follows the old route of the Panama Railroad, most of it will be submerged when the canal dams are in use and Gatun Lake formed.

The importance of such a permanent connection between the Atlantic and Pacific cable systems cannot be overestimated. The risks of interruption to which the overhead line was previously subjected are now entirely eliminated. This cable being permanently connected to the company's cable from Colon to Cuba, without relaying of traffic at Colon, materially reduces the time of transit and liability to error. It is believed that there is no other instance of a cable of this length being laid in this manner and under such unusual circumstances and conditions.

The cable was manufactured in one continuous length by the Kerite Insulated Wire and Cable Company at their works at Seymour, Conn.

The electrical part of the work, testing, etc., was in charge of Mr. Otto Strubel, the electrical engineer of the company.

Pensions for the Members of the United States Military Telegraph Corps.

In the House of Representatives, March 17, the following bill was introduced by Congressman Martin B. Madden, of Illinois, and referred to the committee on military affairs and ordered printed:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the Secretary of War is hereby authorized and directed to issue a certificate of honorable discharge from the Army of the United States to all persons or representatives applying therefor who have received, or shall hereafter receive a certificate of honorable service by virtue of the Act of Congress entitled "An act for the relief of telegraph operators who served in the war of the rebellion," passed January twentieth, eighteen hundred and ninety-seven, and approved January twenty-sixth, eighteen hundred and ninety-seven; provided, however, that no claim shall accrue therefrom except the rights allowed to enlisted soldiers of the civil war beginning only from the date of such discharge."

On March 18 Congressman J. V. Olcott, of New York, introduced the following bill, which was also referred to the committee on military affairs and ordered printed:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the Secretary of War is hereby authorized and directed to issue certificates of honorable discharge from the United States Army to all persons who have received or who shall receive from the Secretary of War certificates of honorable service in the United States Military Telegraph Corps."

These two bills are designed to do justice to the military telegraphers of the Civil War, whose ser-

vices in that struggle were unsurpassed by any body of men engaged in that memorable conflict. Their skill in deciphering the Confederate messages that fell into their hands is one of the marvels of modern warfare. Their prompt and patriotic wisdom more than once saved an army from destruction. No coward or traitor was ever found in the military corps. They were for the most part young men of fine breeding and first-class education—young Americans who could have earned more money in civil life, but who put their patriotic skill and bravery at the service of the country in response to her cry of need.

The military telegrapher of the Civil War was a soldier in the highest and truest sense of the word. The only reason he was not mustered into the service was because Abraham Lincoln, in consideration of the delicate and important nature of the telegraph, desired, as commander-in-chief of the army, to keep this corps under his own control, rather than leave them subject to the orders of a variety of subordinate commanders. He promised military status to the Civil War telegrapher as soon as the war should close, but at its close the President was assassinated and the management of the government fell into other hands.

For more than a generation this diminishing corps of patriotic participants in that great struggle have been pleading in vain for the recognition they would long since have enjoyed but for the bullet of John Wilkes Booth. The services of the Civil War telegrapher marked a new epoch in military science. On the basis of his work during those years the military telegraph corps has been established as an integral part of the army of every civilized nation in the world.

But the anomalous and pathetic fact remains that the men whose patriotism and intelligence are responsible for it, and who actually bore the brunt of perilous and wearing warfare, are not allowed to share in the fruits of their own devotion. It is one of the saddest chapters in American military history. A small remnant of that old military telegraph corps now remains—less than two hundred men. Some of them are in destitution and are compelled to humiliate themselves by accepting a pension from Andrew Carnegie. But the humiliation rests chiefly on this great, rich country of ours, and upon a Congress which has voted away vast sums to less deserving causes.

The old military telegraphers, few in number, have not been able to command great political influence, but surely they deserve as much military recognition as their successors, now registered as a recognized part of the army. The disposition to justify our neglect on the ground that if we now gave military status to the Civil War telegrapher, we would be compelled to do it for the teamsters, sutlers and quartermaster clerks, is an unworthy attempt to shirk a serious responsibility already too long delayed. The Grand Army of the Republic in their national encampment at Milwaukee magnanimously declared for such legislation as these bills propose.

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APRIL 16, 1909.

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.

The Question of Underground Telegraphs.

A well-known telegraph authority, commenting upon our editorial in the April 1 issue on the question of underground wires, has this to say regarding the subject which is attracting so much attention in these days:

"After such a storm as the one at Washington and Baltimore on March 4 the public and the public press, with usual American impetuosity, leaped to the conclusion that all the wires between cities should go underground. That bubbling up soon disappears, however, but there is another and more serious feature, namely, that it strengthens the inclination of city authorities to order undergrounds in suburban districts without the slightest investigation on their part as to the necessity, disadvantages and enormous cost of such installations, and the hardship imposed thereby on the telegraph and telephone companies."

There is in this observation at least one excellent text that can be used to advantage as the basis of an instructive article.

The managers of local offices in all sections of the country where from time to time underground propositions are being hatched should make it their business to enlighten the lawmakers on the subject, pointing out the enormous cost of and the great objections to underground systems in suburban districts. As a matter of fact, this ought to be considered one of the duties of a manager, and a local official who does not interpret the scope of his office to include legislative education is lacking in one of the most essential qualifications of his position. Timely action and explanations on the part of enterprising managers may prevent unwarranted legislation by city authorities. Members of city councils are, as a rule, ignorant of the great cost of burying the wires or they would move more slowly in ordering such action, when, as in many instances, there is no necessity for demanding the abandonment of overhead lines. Such action is usually the result of a desire on the part of municipal officials to emulate what others elsewhere are doing in the same direction, without regard to conditions which perhaps made the burial of wires a necessity at some other point. The theory that if an underground system is the thing for one town it ought to be a desideratum in all cities, large or small, is at least debatable. A manager who enlightens the members of his city council upon the difficulties to be encountered on such a move, as well as the great expense that confronts the companies in making this change, and thus at least postpones proposed legislation on the subject, does his company a service quite within the province of his office. He is the representative of his company in the locality in which he resides, and as such he should be an official in fact as well as in name.

The Texas Ouster Suit.

The Texas Court of Civil Appeals, at Austin, Texas, in a decision handed down, on March 31, held that the fact that the Western Union Telegraph Company accepted the provision of the federal telegraph act of 1866 does not make of the company a governmental agency and does not relieve it from paying a permit fee or franchise tax on business of a local nature in Texas. The case will be appealed to the Supreme Court of the state, and then to the United States Supreme Court.

This is the ouster and injunction suit instituted some time ago against the telegraph company to oust it from the state and for an injunction to restrain it from conducting intrastate or local business in Texas without having obtained a permit from the secretary of state. The action of the Court of Civil Appeals carried affirmance of the judgment for \$100,040, which is the amount of the permit fee the state is suing for on the capital stock of \$100,000,000 of the company.

The telegraph company contended that it was not liable to Texas for the entire franchise tax and did not require a permit, as it was chartered under the act of 1866, by a federal act for the purpose of doing interstate business in the several states of the

union, and was a government agency. The state contended that it did not want to interfere with the company in doing a strict interstate business, but the injunction was asked to restrain them from doing business of a local nature.

At the same time it would appear that the Texas state authorities demand from the company a tax on its entire capital, a very small portion of which is represented as the value of the company's property within the limits of that state. It is therefore apparent that should the contention of Texas stand, Delaware, Rhode Island, and any other of the smaller states would have grounds upon which to base a demand for taxes from the company on its entire capital. Presuming the amount to be similar in other states to that asked for by Texas, which is nothing less than confiscatory, approximately \$5,000,000, would be the amount imposed upon the telegraph company for the privilege of handling an interstate business in the various states of the union. It is more than probable therefore that the supreme courts will reverse the decision of the two lower courts of Texas that have upheld the validity of the state's claim.

The French Telegraphers.

The calm following the storm of the postal and telegraph strike in France is, to some observers at least, more ominous than reassuring. The situation is plainly this, that the tendency is towards a government, actual if not by law, under the practical control of communitard committees, responsible to the "proletariat" and without regard for the Chamber of Deputies. The situation is the more complicated from the fact that the Clemenceau government has favored the formation of associations of civil employes. The evil lies in the fact, which might have been foreseen, that these associations have fallen under the control of self-seeking leaders who are, apparently, inspired less by any strong principle than by personal ambition and private gain.

There is now created a permanent strike committee which had issued a manifesto thanking the public for its patience and forbearance, but at the same time declaring the refusal of the employes to obey or to recognize M. Simyan, their unpopular chief, whose immediate removal they demanded. They have announced that they cannot accept the decision of the government to stop the pay of the postal strikers during the days when they ceased work and have protested against the intended punishment of those who signed rebellious appeals, and insist that the government's plan of rewarding the faithful employes who remained at their posts during the strike must not be put into effect.

The only offsetting authority is the Chamber of Deputies and the unions are frankly contemptuous of that body. It is a serious problem for the government, which has proven weak in this critical emergency, and upon its solution may

depend the industrial, if not the political, peace of France.

The *Journal des Débats* placed the responsibility where it belonged in these words:

"That the pusillanimity of the Ministry and Chamber of Deputies should cover such an event with complete amnesty without even the presence of repression, is one of the most astonishing scandals of contemporaneous history. It is an alarming symptom of decomposition, disorder and anarchy."

That these forebodings were not unjustified, says another well-known authority, was shown by the proceedings in Paris on Sunday, April 4, when 10,000 persons took part in a meeting to promote a union between the government employes of various classes and the labor unions. The late telegraph strikers were represented, and overtures were received from other groups—the prison warders, for instance. The proceedings were in the hands of some of the most dangerous demagogues in France. Pataud, who headed the strikers that left Paris in darkness for a night or two on two separate occasions, made a speech which seems to have been animated with the same spirit of anarchy that drenched Paris in blood during the outbreak of the Commune in 1871. Other speakers were equally violent. Repudiation of the government, the Parliament, the republic itself, were launched in unbridled language and cheered to the echo.

So long as the majority of the Chamber remains true to sanity and patriotism and so long as the regular army remains faithful, these threats can never fructify in actual revolution, social or political; but the prospect, which seems only too likely, of a general strike—perhaps on May Day, the danger point of the French calendar—with all its resultant evils, even to riot and bloodshed, is a terrible rebuke to the government for its folly in yielding in any degree to mob pressure. Because he lacked the courage to uphold the majesty of the law and the authority of the state and trust to the good sense of the French people to vindicate him, M. Clemenceau may presently find himself compelled to array the army against a misguided and frenzied section of the people, while he must contend against forces of reaction that will be only too sure to seize upon the occasion for crying out that the republic is a failure.

The statesman is surely lost who concedes anything in dealing with revolt against the authority of the state.

From thorough tests made by the United States Forest Service on various pieces of timber it appears that thoroughly air-dried or seasoned timber has about double the strength of the green material. It is well known to all operators of wood-preserving plants that antiseptics are not only difficult to inject into green wood, but that it is practically impossible to obtain a uniformly satisfactory treatment of such material at an economic cost, for the purpose of insuring a prolonged life.

The Telephone for Train Despatching.*

BY W. E. HARKNESS, OF NEW YORK.

(Continued from page 262, April 1 issue.)

The improved line construction and telephone apparatus available to-day for this service is far superior to that used even five years ago, and this, together with the safeguards already used in the issuing of train orders, is ample to reduce the chance of error to a minimum. It must be remembered, however, that any method of transmitting intelligence involving the co-operation of human agencies is necessarily subject to error and the telephone is not an exception to the rule. It must also be remembered that no mechanical device is free from troubles, but all that can be done is to make it as nearly free from trouble as possible, and I believe that the telephone apparatus of to-day is superior to the telegraph apparatus in this respect, and further possesses the advantage that it can be used by anyone who can talk and hear.

In criticising the telephone for railroad service, particularly train despatching, it has been stated that all voices are not transmitted equally well by telephone. This is true, but trouble from this cause is seldom experienced, and it will be possible to obtain employees with suitable voices easier than it is to get employees who can send good Morse. It is also possible that a man's voice may be affected sufficiently by a cold to interfere with transmitting by telephone; this, however, is usually temporary and with the telephone some one else in the office can readily take his place, which is not always true when, on account of sickness, a telegrapher cannot work.

It should also be remembered that the telegraph operator is subject to paralysis of the arm due to the continued use of certain muscles in the wrist when sending. There is no such effect or any other physical trouble caused by the continued use of the telephone, and further, its introduction and use enables many telegraph operators already affected with paralysis, but otherwise efficient employees, to continue to carry on their work in a satisfactory manner. This should also appeal to other operators now using the key.

A very marked effect upon the relations existing between the despatcher and the operators has resulted from the use of the telephone. It has been found that these employees have become better acquainted since using the telephone, and that this has resulted in closer co-operation in the performance of their work. It is usual to find the men calling each other by their given names and the fact that they are talking with each other seems to have eliminated the caustic remarks and comments so frequently sent by telegraph. The remark of a despatcher after using the telephone for several months to the effect that he "had not been mad once since using the telephone" is well

worth repeating as it indicates an improved condition. Another illustration of this is the reason given by an operator when asked why he liked the telephone. His answer after some thought was this: "If you and I were working together in an office and you had something to say to me you would not write me a message telling me what you wanted done and then send it to me by telegraph, you would turn around and talk to me. That's why I like the telephone." This statement seems to have reached the root of the matter, namely, direct personal communication.



PORTABLE SET—CLOSED.

The fact that the telephone can be used by train crews enables the despatcher to get in direct communication with the conductor or engineer, and in case of emergency, obtain at first hand the conditions. By equipping the trains with portable telephone sets the despatcher may be reached from any point between stations in case of breakdown.



PORTABLE SET—OPEN.

The location of telephones at sidings, which may be connected to the despatcher's line and thus enable train crews to keep the despatcher posted as to their movements will be of considerable value.

The Union Pacific Railroad is using siding telephones together with signals which are under the

* Paper read before the St. Louis Railway Club, February 12, 1909.

control of the despatcher. These signals are used to assist in the movements of trains when changes in schedule can be effected to advantage.



TELEPHONE SET FOR MOUNTING IN BOOTH AT SIDINGS AND CROSSINGS.

The first of the present type of telephone despatching circuits was installed by the New York Central and Hudson River Railroad in October, 1907, between Albany and Fonda, New York, a distance of forty miles. This section of the road is on the main line and has four tracks controlled by block signals.



OUTDOOR SET FOR SIDINGS AND CROSSINGS.

The Chicago, Burlington and Quincy Railroad was the next road to install train despatching circuits. In December, 1907, a portion of the main line from Aurora to Mendota, Illinois, a distance of forty-six miles, with eleven offices was equipped. This was followed by a section between Aurora and Galesburg, Illinois, a distance of one hundred and twenty-five miles, with sixteen offices. A third section between Aurora and Clyde, the end of the Chicago terminals, a distance of twenty-eight miles, with fifteen offices, was equipped. All of these circuits covered a double track road on which reverse movements are made.

These installations were followed by an equipment on their single track line between Aurora and Savanna, Illinois, a distance of one hundred and six

miles, with twenty-three offices. This later equipment resulted in convincing many who were skeptical as to the use of the telephone on single track roads, as it was found that not only was the telephone service more satisfactory but safer than on double tracks when reverse movements were made.

These installations were followed by others until at the present time there are over twenty telephone despatching circuits in use on the Chicago, Burlington and Quincy Railroad, covering one hundred and twenty-five miles of double track, twenty-eight miles of multi track, and 1,381 miles of single track, and connecting with two hundred and eighty-six stations.

Other railroads have equipped portions of their lines with telephone despatching circuits and, except where due consideration of the various factors entering into their individual problems has been overlooked, have been successful in demonstrating the superiority of the telephone over the telegraph.

Among these are the following: New York Central and Hudson River; Lake Shore and Michigan Southern; Chicago and Northwestern; Michigan Central; Chicago, Milwaukee and St. Paul; Northern Pacific; Delaware, Lackawanna and Western; Great Northern; Chicago, Rock Island and Pacific; Union Pacific; Illinois Central; Canadian Pacific; Atchison, Topeka and Santa Fe; Erie; Virginia Railway, and West Jersey and Seashore.

Numerous other roads have ordered equipment for this service or are contemplating doing so.

When it is remembered that this development has occurred in a little more than a year, and has been effected without the occurrence of a single accident which can be traced to the use of the telephone, it must be conceded by even the most skeptical that the telephone is at least equal, if not superior, to the telegraph for this service.

An outline of the factors entering into the problem of rendering telephone service for train despatching will, it is believed, enable those not conversant with the details of the service to realize what must be considered when preparing for this service and also what has been accomplished by the manufacture of telephone and selective apparatus during the short time in which the demand for such service and apparatus has existed.

The construction of the line for this service is one of the most important matters. In view of the fact that interference with the service affects the earning capacity of the road, great care should be taken to see that the best material possible be used in the construction of the line and that every means be taken to prevent interruptions to the service brought about by mechanical or electrical disturbances on the line.

Hard drawn copper wire of sufficient size to withstand wind and sleet should be used, and the line should be a metallic circuit. The wires forming the circuit should be properly transposed and so located in relation to other circuits as to

prevent inductive disturbance from other wires or mechanical injury.

The introduction of considerable amounts of cable in the circuits, particularly rubber insulated telegraph cable, should be avoided as it reduces the volume and affects articulation. When cable must be used, lead covered paper insulated telephone cable having the wires twisted in pairs to prevent inductive disturbances should be used not only on account of it affecting the transmission less than the rubber insulated cable, but also on account of its lower first cost. Cable of this type can be furnished to withstand the potentials used on telegraph circuits, and on account of its low capacity, as compared with rubber insulation, will improve the operation of telegraph service as well as that of the telephone circuits.

When adjacent telegraph or telephone circuits are to be used in cases of emergency as patch circuits for the despatching circuits, care should be taken to see that they are in first-class condition before being used for this service. In some cases it has been found that such wires, owing to temporary repairs, are of various sizes and kinds of material and contain poor joints which, until discovered and removed, have occasioned poor service and increased the maintenance expense.



TEST PANEL FOR PATCHING.

When constructing new lines it is well to bear in mind the future extension of the circuits or their use for patching other long circuits in cases of emergency, as considerable saving can often be effected by the proper selection of the kind and size of wire to render the desired service. It may often be more economical to provide wire of a larger size than is necessary at the start to provide for service which will be required in the future.

The lines recently constructed for despatching service have, in general, been well built and with but few exceptions have been free from inductive disturbances or mechanical defects.

Copper wire weighing two hundred and ten

pounds per mile has been used. This is of sufficient size to render a very high grade of telephone transmission over lines in excess of those now required for despatching service. With the usual pole line construction of from thirty-five to fifty poles per mile, a circuit of this kind will, with few exceptions, withstand severe wind and sleet storms.

The usual practice is to transpose these circuits every quarter or half mile, depending upon the number and kind of circuits on the same pole line. This has been found sufficient except under abnormal conditions when special transposition must be provided.

In view of the fact that the present pole lines are available for these circuits the expense of building a telephone circuit is not excessive, particularly when the advantages gained by this service are considered.

Such a circuit as those which are now being used will cost approximately \$85.00 per mile or an average despatcher's circuit covering a division one hundred and fifty miles in length would cost about \$13,000.

These figures do not include the telephone and selective apparatus, the prices of which vary according to the type used.

The depreciation of a circuit of this kind is very low as the average life of copper wire is considered to be fifty years. The average life of an iron circuit is from fifteen to twenty years under favorable conditions.

The despatching circuit which should be provided for emergency use may consist of two adjacent telegraph or telephone wires. These two wires should be transposed to prevent inductive disturbances when they are used in the despatching circuit.

These wires may be used for telegraph or telephone service under normal conditions.

By applying suitable apparatus to two such wires two duplex telegraph circuits and one metallic telephone circuit may be obtained which will permit of four telegraph messages and one telephone message being transmitted simultaneously.

Such a circuit as this has been in use on the Union Pacific Railroad, between Omaha, Nebraska, and Cheyenne, Wyoming, since last June and has been rendering excellent service. When the telephone circuit is not being used for official conversations between division headquarters, it is used for the transmission of messages which otherwise would be sent by telegraph.

The following figures will give some idea of the traffic handled over this circuit in a month:

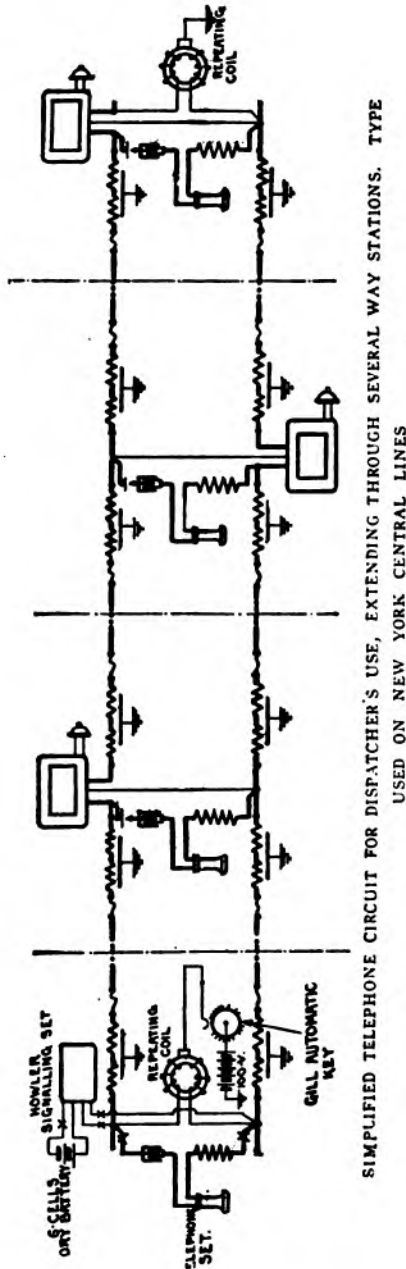
Messages handled by telegraph.....	59,020
Messages handled by telephone.....	30,703
Conversations by telephone.....	2,539
Time consumed by conversations	
126 hours, which is equivalent in	
messages to	3,780
Total.....	93,503

A comparison of the telegraph and telephone traffic on this line is interesting, particularly when it is understood that the telephone messages are handled at a much smaller expense than those handled by telegraph.

Further, the telephone operators handle as high as four hundred and fifty messages per day, and it is believed that this could be increased to a larger

should be remembered that the conditions on a despatching circuit differ in many ways from those prevalent in either local or long-distance service.

The length of the line, the kind and size of wire, the number of stations connected to the line, the kind of telephone, transmitter, receiver, induction coil and circuit, together with the kind and



SIMPLIFIED TELEPHONE CIRCUIT FOR DISPATCHER'S USE, EXTENDING THROUGH SEVERAL WAY STATIONS. TYPE USED ON NEW YORK CENTRAL LINES

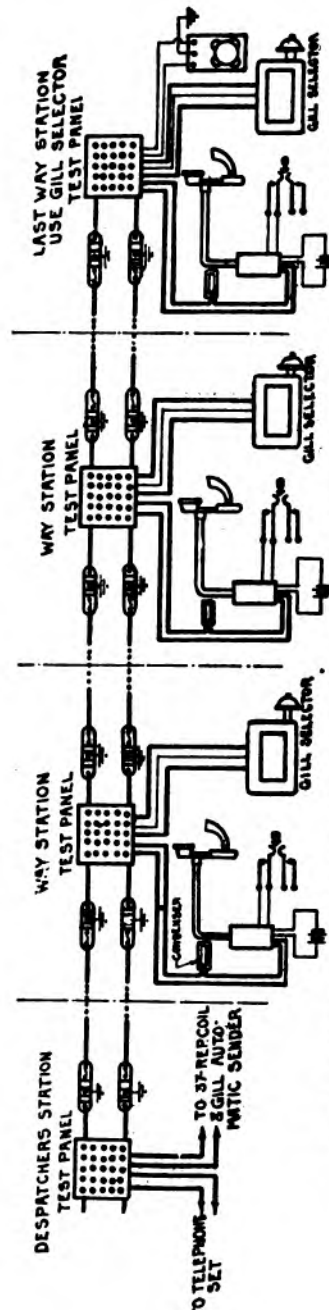


DIAGRAM INDICATING METHOD OF CUTTING STATIONS INTO TELEPHONE CIRCUIT FOR DISPATCHER'S USE

amount if the line were not used so much for conversations.

The telephone apparatus used for train despatching service should be such as to render the voices of both the dispatcher and operators distinct and of sufficient volume to prevent mistakes.

To accomplish this in a satisfactory manner due consideration must be given to the conditions which must be met, and in this connection it

amount of current supplied, all have a bearing on the service and changes in any one of these factors will affect the service.

(To be continued.)

If you wish to know all about the instruments you work, invest \$1.50 in a copy of Jones' diagrams.

The Military Telegrapher in the Civil War.

PART XVII.

Henry H. Atwater, now residing in Brooklyn, N. Y., was a well known and highly trusted military telegrapher during the latter part of the Civil War. Being stationed in and around Washington, many important messages passed through his hands, some of which are now for the first time made public. The confidence which was placed in him is best shown by his straightforward and interesting account of the part which he played in the events transpiring around the capital during the closing days of the war. In writing to Colonel William R. Plum, the historian of the United States Military Telegraph Corps, in October, 1878, he said:

"I commenced telegraphing in the year 1856 on the New York and Erie Railroad at Corning, N. Y., and have been in the business most of the time since. In October, 1863, I offered my services to Major Thomas T. Eckert, who accepted them, and I was placed on day service at the War Department office under David Homer Bates, who was manager. Within a week or two I was sent to the Navy Yard in Washington to relieve W. H. Hall, who was, I believe, sent to the front. Most of the time during my military service was spent at the Navy Yard, first under command of Commodore Harwood and afterwards under command of Commodore Montgomery. Mr. W. C. Barron was my night operator. We had two lines; one from the War Department to the Navy Yard, thence down the Potomac to St. Inego's, the headquarters of the Potomac flotilla, commanded by Commander Parker, thence to Point Lookout, where the Rebel prisoners were kept, and where the headquarters of Surgeon-General Barnes were located. The other wire was a city wire running from the War Department to the Navy Yard, thence to the arsenal and Seventh street wharf. The operator at the Seventh street wharf was T. N. Loucks. The operator at the arsenal was Thomas Morrison (now in the Treasury Department in Washington), and he was succeeded by Henry H. Bishop (now deceased). My business at the Navy Yard was principally with the Ordnance Department in the Yard, with the commandant of the Yard and also with the Potomac flotilla. Nothing of importance occurred outside of the regular routine official business until the fifth of March, 1864, when I received a message, of which the following is a copy:

From the Navy Department, March 5, 1864.

To Commandant F. A. Parker, Potomac Flotilla:

The McClellan, which is laying a cable and which the raiders will endeavor to capture, is armed with a twenty-four pounder. Take two or three of your best vessels in the river and spread out in the bay after them.

(Signed) Gideon Welles,
Secretary Navy.

"Accompanying this message I received the following:

To H. H. Atwater, Navy Yard:

Let the commanding officer of the Baltimore take

this de-patch down to Commander Parker:

(Signed) Gideon Welles,
Secretary Navy.

"About the sixth or eighth of July, 1864, we received word that Breckenridge and Early were making a raid up the Shenandoah Valley and later that they were intending to cut off communication between Washington and Baltimore, and I received a message for Commander Parker, informing him that the probable intention of the enemy would be to burn Gunpowder bridge and ordering him to proceed there at once with his flotilla to do all in his power to protect the same. At this time the greatest excitement prevailed in Washington. On about the ninth of July we received the report that the Rebels were marching on Poolsville, still later that they were marching on Tennyaltown (Fort Reno), and it was reported that John H. Dwight, operator, who had been sent out to Poolsville, was cut off. On the following day, the tenth of July, I received a message from Major Eckert to report to him at the War Department, preparatory to going to Fort Reno. On the receipt of this message, as was my duty, I handed it to Commodore Montgomery. "Why," said he, "these are the times when we need a responsible person in our office, and it is desirable that you should remain here." He immediately sent a message to Major Eckert, requesting that I be retained in the Navy Yard. Shortly afterwards I received one of the major's short but characteristic messages, which read: "You will report to the War Department at once," at the same time informing Commodore Montgomery that as I was needed elsewhere he would send another operator there, who would answer every purpose. After the receipt of the order I lost no time in presenting myself to the War Department, where a pass was presented to me, and I was informed that an ambulance was in waiting to convey me to Fort Reno. We started, the driver and myself, and did not slack rein until compelled to do so by the horses showing signs of giving out, the day being one of the hottest I had ever experienced. On either side of the road lay sunstruck soldiers under the shade of every tree and frequently we would meet droves of cattle and horses and household effects being driven into the city to escape seizure by the Rebels. We were also often told of houses being destroyed and that the enemy was still marching towards Washington. About four o'clock I reached Fort Reno, relieving W. C. Barron, who was on duty there, and who returned to Washington and took my place at the Navy Yard. I found the fort in command of Brigadier-General Hardin, to whom I reported. A day or two later Thomas H. Armour was assigned to me as night operator. On the evening of July 10, about ten o'clock, we were startled by the report that the enemy were intending to attack us that night, as the following message which I sent will show:

To General Auger, commanding forces about Washington, War Department:

The chief officer of pickets says the enemy are apparently making every preparation for a grand assault,

tearing down fences, band playing, cavalry moving to our left, cannot a part of the sixth corps be hurried up at once.

(Signed) M. D. Hardin,
Brigadier-General.

"Upon the receipt of this report all hands were aroused as we momentarily expected an attack, and General Hardin remarked to me at the time that unless we received reinforcements it would be very doubtful if he could hold the fort, and said that in case we were attacked I had better run my wire to the inside fort in order to keep up communication with Washington as long as possible. but as things turned out the precaution was unnecessary. All night long we were watching the soldiers sleeping on their arms, but the expected attack did not occur.

"The following morning, July 11, at 10 o'clock I sent this message:

To Colonel Alexander, Engineers' Office, Washington:
Send a working party here: as many as you can raise, with axes and intrenching tools to cut down orchards in front of this line, remove buildings and make rifle pits.

(Signed) J. C. Barnard,
Brevet Major-General, Chief of Engineers.

"Shortly afterwards the large two-story building which was used as the headquarters of General Hardin, and in which my office was located, was torn down and the hotel close by was used for the general's headquarters and also for my office. On the evening of the 12th a sharp engagement, which was witnessed by President Lincoln, took place in front of Fort Stevens, where T. N. Loucks was temporarily stationed, and which was just east of Fort Reno. Our forces lost about 200 killed, and the enemy was driven off. In this engagement the sixth corps and a part of the nineteenth which had just returned from New Orleans was engaged. The next day the sixth corps, under General Wright, passed Tennallytown in pursuit of the enemy, as the following message shows:

Headquarters 6th Corps, Tennallytown, 4.30 p. m.
To Hon. E. M. Stanton:

Your despatch received. The head of my column is passing this point and will be pushed forward to the limit of the endurance of the men. Before leaving I ordered up a portion of the 19th corps. Should more arrive I would ask that they be directed to follow with such artillery as they may need and can be supplied from the department at Washington. I have taken only what artillery I have, possibly six batteries. Since writing the above I have received your despatch by messenger, with copy of letter from Lieutenant-General Grant to Colonel Townsend. I can assure yourself and the President that there will be no delay on my part to head off the enemy and that the men I have will do all that this number of men can do. They have been well tried and never found wanting.

(Signed) H. G. Wright,
Major-General, Commanding.

"On July 13, 1864, Major General Wright took command, as the following message will show:

Headquarters Sixth Corps,
Tennallytown, July 13, 1864.

To Colonel E. D. Townsend, Assistant Adjutant General, U. S. A.:

I have the honor to acknowledge the receipt of your despatch of 4.45 p. m., assigning me to the com-

mand of the forces moving against the enemy from Washington and elsewhere.

(Signed) H. G. Wright,
Major-General Commanding.

"At 10.35 p. m., July 13, I received the following message by a messenger from General Wright to be forwarded to Washington:

Headquarters Sixth Corps,
Offuth's Cross Roads, July 13, 7.30 p. m.
To Major-General Hallock, Chief of Staff:

I reached this point with the cavalry about one hour ago without incident, and the head of the infantry column is nearly up. I shall camp here for the night and unless the reports from the cavalry shall occasion a change I shall move for Edwards Ferry at 4.30 a. m. to-morrow. The reports from cavalry are not entirely satisfactory, but I hope to get that which is more reliable before moving. What I have would indicate that the rebel force has moved west, probably to Edwards Ferry.

(Signed) H. G. Wright,
Major-General Commanding.

"Major-General Ord, who had been in command at Baltimore, arrived at Tennallytown July 14. The following was received by me and speaks for itself:

City Point, July 14, 1864, 2 p. m.
Major-General Ord, Baltimore (forwarded to Fort Reno):

Push out all the force you can and make the enemy develop himself if in your front. If gone follow with as much strength as you can, having proper regard for the safety of the city.

(Signed) U. S. Grant,
Lieutenant-General.

"On July 15, General Ord was ordered to report to General Grant, and the enemy having been driven back on the 16th or 17th, I was ordered to report to the Navy Yard, which I did. From that time forth nothing of moment occurred at the Navy Yard until the never-to-be-forgotten 14th of April, 1865, when I was startled about 11 p. m. by receiving word from George C. Maynard at the War Department that President Lincoln had been assassinated, and immediately notified Commodore Montgomery, the commandant of the Yard. Shortly afterwards I received the following for Commander Parker, and as he was down the river it was delivered to Lieutenant Commander Eastman:

War Department, 14th April, 1865. An attempt has been made this p. m. to assassinate the President and Secretary of State. The parties may escape or attempt to escape down the Potomac.

(Signed) J. H. Taylor,
Chief of Staff.

"At 1.10 a. m., April 15, I sent the following messages:

Navy Yard, Washington.

To S. Nickerson, St. Ingeoes:

Send fastest vessel you have with the following message to Commander Parker:

(Signed) T. H. Eastman,
Lieutenant-Commander Potomac Flotilla.

To Commander Parker:

An attempt has this evening been made to assassinate the President and Secretary Seward. The President was shot through the head and Secretary Seward had his throat cut in his own house. Both are in a very dangerous condition. No further particulars. There is great excitement here.

(Signed) T. H. Eastman,
Lieutenant-Commander U. S. Potomac Flotilla.

"April 15, at 8 a. m., I received word from the

War Department that the President had died at seven-twenty-two. The following messages were received, the importance of which show for themselves:

War Department to Navy Yard office:

Remain on duty all night unless permission is given to close. Answer.

(Signed) T. T. Eckert,
Major and Assistant Quartermaster.

War Department, April 15, 2.20 p. m.

To Commodore Montgomery, Navy Yard:

If the military authorities arrest the murderer of the President and take him to the yard, put him on a monitor and anchor her in the stream with strong guard on vessel, wharf and in yard. Call on Commandant Marine Corps for guard. Have vessel immediately prepared ready to receive him any hour day or night with necessary instructions. He will be heavily ironed and so guarded as to prevent escape or injury to himself.

(Signed) Gideon Welles,
Secretary Navy.

War Department, April 15, 2.20 p. m.

To Colonel Jacob Zeilin, Commanding Marine Barracks, Navy Yard:

Have extra strong and careful guard ready for special service if called for by Commodore Montgomery.

(Signed) Gideon Welles,
Secretary of Navy.

"In connection with this it should be borne in mind that all sorts of rumors were afloat and it was feared an attempt would be made to rescue the murderer. That night Payne, the accomplice of Booth, was caught and placed on the monitor, which was moved into the stream according to instructions. A few days afterwards Booth's body was brought to the Navy Yard and placed on a monitor and covered over with a sailcloth which I saw, having occasion to go to the wharf to deliver a message to one of the officers. The same night his body was taken to the arsenal in a small boat, as I was informed by Mr. H. H. Bishop, operator at the arsenal, who was there when his body arrived.

"On the 10th of October, 1865, my services being no longer needed and orders having been issued to reduce expenses, I was honorably discharged, Mr. D. H. Bates, one of the best friends I ever had, securing me a situation with a commercial company in Washington."

Eucalyptus Telegraph Poles.

The government has undertaken a study to determine the proper method of seasoning eucalyptus poles, particularly those cut from trees which, owing to a large number of knots, will not make clear lumber. Such poles have shown a tendency to check and warp after being cut, probably due to improper methods of seasoning, which has been a great obstacle to their more extensive utilization.

Experiments will be carried on by the United States Forest Service to determine the method of seasoning which will prevent this checking and warping. One series will be conducted on the Sutro estate, which is in the fog belt, and another on the Pacific Land Investment Company's holdings at Newark, which is out of the fog belt.

Forty-eight growing trees, thirteen inches in diameter and having a clear length of thirty-four

feet, will be selected and marked by an officer of the Forest Service. These two groups will be handled in the same way, twelve trees of each group are to be girdled and allowed to die and season standing, with the bark on, and the other twelve will be felled and laid on skids in the open and seasoned in the following manner: Six of the twelve felled trees of each group will be peeled, and the other six will be left with the bark on.

The skids will be so constructed that the poles will be at least one foot from the ground to allow a free circulation of air. The poles will be left on the skids for from six to eight months, and observations taken as to checking, warping, shrinkage, and loss of weight. The same observations will be obtained from the standing poles, with the exception of the weight.

When a sufficient period of seasoning has elapsed, determined by the weight of the skidded poles, the standing poles will be cut and their weights found. The condition of these poles will then be compared with the condition of the skidded poles, and a proper method of seasoning outlined which will be available to all interested in the use of eucalyptus timber for telegraph poles.

Colonel Chandler on Promotion.

Colonel A. B. Chandler, chairman of the board of directors of the Postal Telegraph Cable Company, New York, in a contributed article to the "Postal Telegraph," the monthly publication of the company, among other remarks offers this very appropriate and timely advice:

"It is not infrequently a matter of wonder on the part of employes that recognition of merit, and hence promotion in place or pay, or both, should come to one rather than to another, and this sometimes leads to discontent and a desire to enter upon some other field of effort. This is not peculiar to the telegraph business, but it is true to some extent of almost every occupation. The story of the lives of those who have achieved success almost without exception shows that careful and persistent study of the needs of an enterprise in what may be termed its internal construction and its use by and effect upon the public, so that actual conditions become well understood, together with the exercise of sound judgment, fairness, promptness and firmness in dealing with whatever falls to the care of the individual, never fails to attract the favorable attention of owners and managers of property interests, and to secure such person all the benefits attainable in his particular line of duty."

Spain's decision to decentralize the government and permit a greater latitude in provincial and municipal rule is causing widespread comment. These movements have the support of the cabinet ministers. If the reforms are authorized and the results prove beneficial the movement to decentralize government functions will have received a decided impetus, and will no doubt be followed by other countries composing the so-called "effete east."

A Mechanical Rectifier.

An alternating current rectifier is a device for altering the polarity of one of the two waves which form a complete cycle of alternating current so that both waves will flow through the rectified circuit in the same direction. As each alternating current wave is continually varying in value from zero to a maximum and then to zero again, the rectified current will vary in the same way, but unlike the original current will not change its direction upon reaching the zero value. The required change in polarity may be effected either by mechanical means or by chemical means. In the March 1 issue of *Telegraph Age* a simple chemical rectifier was described. We will now explain the principle of the mechanical rectifier.

If a metal ring is divided into two portions, each insulated from the other, as shown in Figure 1, and these parts are connected one to each of the alternating current supply wires, A and B, the sections will change their polarity with each reversal of the supply current. If a circuit, R, is connected to the sections of the ring, as shown, the flow of current in it will reverse with each reversal of the current in A and B. If, however, as shown in Figure 2, the circuit, R, is connected

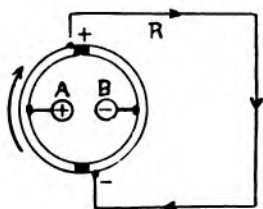


FIGURE 1.

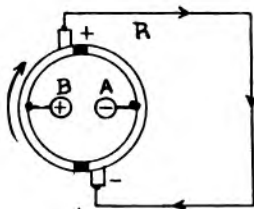


FIGURE 2.

to the rings by means of brushes, which are so arranged as to remain stationary while the ring is made to revolve beneath them, we may cause the current in R to continually flow in one direction. The two requirements necessary to secure this condition are that the ring shall make one revolution for each complete cycle of the supply current and that the brushes be so arranged that the instant the polarity of the supply is reversed each section of the ring shall break contact with one brush and make contact with the other. In Figure 1, A is shown as having just become the positive conductor. In Figure 2 the ring has made one-half of a revolution and B has just become the positive conductor. As shown by the arrows, the direction of the current in R remains the same.

If the ring makes another half turn A will again become positive and the direction of flow will again be as shown in Figure 1. As we have noted, one of the requirements for the success of this device is that the ring shall make one revolution for each complete cycle of the supply current. If we are dealing with sixty cycle current this would mean sixty revolutions per second or thirty-six hundred per minute. To avoid this high speed, the ring may be divided into four equal sections and two opposite sections joined to

one side of the supply and the remaining two sections to the other side. If then the ring is revolved at half its original speed the polarity of the sections will reverse at the same time that the brushes shift from one section to the next as before, and the current in R will continue to flow in the direction desired. By a further increase in the number of sections the speed at which the ring must be revolved may again be reduced. In practice the ring may be mounted on the shaft of a synchronous motor which is fed by current from the same source of supply as the rectifier, the requirement for successful operation in this case being that the ring shall have as many sections as the motor has poles. The current may be conveyed to the sections of the ring by means of brushes and slip rings mounted on the same shaft. This device is adapted for charging storage batteries and electric lighting.

Wire Photos From Washington.

A new method of transmitting photographs by wire, the first instance in this country of the use of the telegraph for the actual production of light and shade, was successfully tried out recently by Collier's Weekly between Washington and New York. By the process employed the work of the camera anywhere, with persons, scenes or documents, may be placed the same day by wire before newspaper readers in any city where the apparatus is installed.

The operators each had a machine combining the functions of transmitter and receiver. A pair of Nernst lamps of 100 candle-power each filled apertures at the end of a rectangular walnut box three feet long. Into the centre of the box projected gossamer wires holding a tiny bit of aluminum.

Further on were lenses, and the shadow of the aluminum, much magnified, was thrown over a pin-like aperture at the further end of the box, acting like a camera shutter.

The light piercing this aperture acted upon a sensitized film, and when the current was in operation this film received impressions of light and shade regulated by the movement of the shutter.

The result at the end of twelve minutes is a photographic negative, ready, like any other for development and printing.

At Washington the film employed was a positive. For sending purposes the film is wrapped around a hollow glass cylinder, and this cylinder receives the negative. It rotates on a screw spindle, causing it to move upward as the process of reproduction goes on.

Employment of the shadow shutter varies the light, according to the depth of photographic color. The succession of varying shadows correspondingly varies the illumination of a cell of selenium, which is set within and above the glass cylinder.

Selenium has the curious property of variation in resistance with variation in the illumination affecting it. Thus with a resistance of 100,000

ohms in total darkness it would have in full daylight a resistance of only 50,000 ohms.

The selenium cell, being included in the circuit of the battery, acts as a regulator of the current strength. In transmission the current must constantly fluctuate according to the succession of lights and shades in the photograph.

The wires which hold the aluminum foil in the receiving station are one one-thousandth of an inch in diameter. They are suspended in the field of a powerful electromagnet. In the effort to get out of the field they move laterally, giving the aluminum foil a constant motion regulated by strength of current and its shadow thus operates as a camera shutter at the receiving film box.

As both the transmitting and receiving cylinders move synchronously, each separate successive current impulse transfers light at one station into light in the same degree at the other station, and the picture is thus photographically reproduced point by point until the photograph is complete.

As the current used varies in intensity because of its service with light and shade effects, the wire employed must be reserved for the use of the machine. There would be trouble if it were used for duplex work while employed in photography.

In use of current the apparatus is very economical, consuming only about one one-thousandth of an ampere.

The machine is the invention of Professor Arthur Korn, of the Munich University, and has several times been referred to in the columns of Telegraph Age. It has been installed for service at London, Paris, Berlin, Copenhagen and Munich.

A Simple Half Set Repeater.

JAMES B. DILLON, MEMPHIS, TENN.

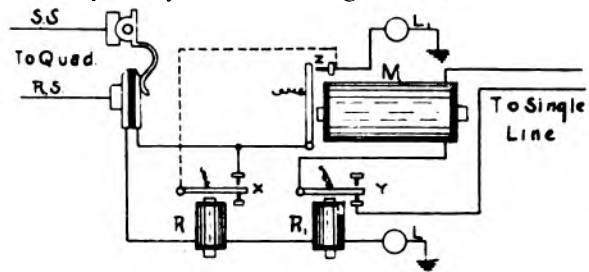
The accompanying diagram shows a simple method of constructing a half set repeater which will give good results in practice and which does not require any transmitter or other special wound apparatus. In case of an emergency it may be fitted up by means of the ordinary apparatus, which is usually found in any telegraph office that would be called upon for a half set repeater. All that is required is two four ohm repeating sounders, one ordinary single line relay and two resistance lamps.

First consider all keys closed, for such is the condition of a single line when not in use. When the man on the quadruplex opens his key, the repeating sounders, R and R₁, are demagnetized, and the single line circuit being opened at x, relay M is demagnetized and the multiplex transmitter circuit is broken at z. At the same time, however, the local point on R closes on the upper contact at x, thus closing again the circuit of the multiplex transmitter through the dotted line connection shown. The multiplex transmitter

circuit thus remains closed at the proper time, as in the case of the Atkinson repeater.

As in all types of repeaters where an unavoidable momentary break occurs in a circuit which should normally remain closed, the air gap between the local point and the upper contact on R should be as small as possible in order to secure the best results and give the lever a minimum play.

The repeating sounder R₁, by opening the main line at point y, when demagnetized, enables the



man at the distant end of the quadruplex to repeat into the single line. The operator on the single line actuates the multiplex transmitter by means of the lever and contact point z of the relay M in the usual way, because as long as the multiplex relay points and consequently the sounder R are kept closed, the dotted line path through x is open.

Unlike many who do a brave thing, "Jack" Binns followed it up by doing a sensible one, and ran away from every attempt made on this side to give him a popular ovation. He succeeded in escaping in New York, but was caught unawares when he reached his home in Peterborough, England.

On leaving the train this modest performer of duty found the streets lined with cheering thousands, and the mayor of the city and the cathedral chapter in their robes of office waiting to welcome him. He was escorted to the Guildhall, where the mayor formally welcomed him on behalf of his native city. "Some men," he said, "are decorated for the slaughter of thousands; you have saved thousands by your gallantry. We present you with this address as a permanent record of your bravery. Your fellow-citizens are very proud of you."

With that notable English characteristic, to make light of what one has done, which marks most men of action, Mr. Binns at once passed on the credit to some one else by saying: "There was a man in the engine-room who remained below, when almost up to his neck in water, to open the steam valve, and so save the ship from being blown to pieces." The days of heroism and common sense have not passed.

According to an English exchange, the telegraph has been extended to Wasdale, the wildest of inhabited places in the lake region of England, possessing the highest mountain, the deepest lake, and the smallest church in that country.

Important Subjects Treated in Back Numbers.

TELEGRAPH AGE has published the best articles on telegraphic subjects that have ever appeared in print. Here-with are enumerated a few of the most important subjects treated, together with the date of the papers containing the same. Copies of these back numbers may be had at twenty-five cents apiece upon application. Address J. B. Taltavall, TELEGRAPH AGE, 253 Broadway, New York.

British System of Timing Messages	Dec. 1, 1902
Buckingham Long Distance Page Printing Telegraph.....	Sept. 1, 1902
Burry Page Printing Telegraph	Apr. 1, 1903
C. K. Jones' Automatic Telegraph Circuit Protector and Sig- naling Machine	June 16, 1903
Collins Overland Telegraph	May 16, 1903
Crehore-Squire Automatic Telegraph System.....	May 16, 1902
Definitions of Electrical Terms, Mch. 16, Apl. 1-16, June 1, July 1-16, 1904	
Earth Currents	May 1, 1903
Engraving of Clarence H. Mackay	Nov. 16, 1902
Engraving of Col. Robert C. Clowry	Apr. 16, 1902
Engraving of the Late John W. Mackay	Aug. 1, 1902
Field's, S. D., Quadruplex	May 1-16, 1904
Ghegan's Automatic Repeater	June 1, Dec. 1, 1903
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K. R. Law as Applied to Quadruplex Circuits.....	Jan. 1, 1904
Postal Telegraph-Cable Company, History of (with por- traits of officials)	Feb. 1, 1904
Postal Telegraph-Cable Company Rules Governing Con- struction and Repair of Telegraph Lines, Apl. 1-16, May 1-16, 1904	
Printing Telegraph Systems, Story of	Jan. 1, 1903
Progress of Telegraphy During Last Thirty Years, W. Mayer, Jr.	Mch. 16, 1904
Protection of Telegraph or Telephone Lines When in Hazardous Proximity to High Speed Lines	June 1, 1904
Repeaters:	
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Half-Milliken	Feb. 16, 1902
Horton	Mch. 1, 1902
Defective Loop	Mch. 1, 1902
Double Loop	Mch. 16, 1902
Milliken	Jan. 16, 1902
Neilson	Feb. 1, 1902
Wainy Phillips	Feb. 1, 1902
Wood Double Loop	Mch. 16, 1902
Rowland Printing Telegraph System.....	Sept. 11, 1903
Scott-Rhodes-Barclay-Page Self-Winding Ticker.....	Oct. 1, 1903
Specifications in Construction of 25-foot Pole Line, Ameri- can Telephone and Telegraph Company.....	Feb. 16, Mch. 1-16, 1904
Typo-Telegraph (Dr. Cardwell) F. J. Swift.....	June 1, 1903
Western Union Telegraph Company History of (With portraits of officials)	Jan. 16, 1904
What Constitutes a First-Class Operator	Oct. 1, 1904
What Constitutes a First-Class Chief Operator.....	Nov. 1, 1904
What Constitutes a First-Class Manager.....	Nov. 16, 1904
What Constitutes a First-Class Superintendent.....	Dec. 1, 1904
What Constitutes a First-Class E. R. Operator.....	Dec. 16, 1904
Churcher Rectifier, J. P. McCabe	May 1, 1903
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Morse Patents, Covering Invention of Telegraph.....	Dec. 16, 1903
Murray Automatic Page-Printing Telegraph, History of.....	Sept. 16, 1903
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Dean Rapid Telegraph System.....	Aug. 16, 1907
How to Make a Telegraph Company Popular, Feb. 1, 16, March 1, 16, 1907	
Rowland Telegraphic System	May 1, 16, 1907
Steno Telegraphy	June 16, 1907
Alphabets Telegraph.....	Feb. 1, 1908
Anniversary Number, Twenty-fifth Year, Containing Full-Page Engraving of Officials and History of Various Telegraph Companies.....	Jan. 1, 1908
Barclay Ptg. Telegraph System (serial) June 16, 1908, to March 1, 1909.	
Commercial Cable Company.....	Jan. 1, 1908
Composite Telegraph and Telephone Systems—E. R. Cunningham	July 16, 1908
Creed Receiving Perforator.....	Nov. 16, 1908
Great North Western Telegraph Co., History of and Portraits of Officials and Principal Managers	Jan. 1, 1908
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Poles, Arborvitae, for Telegraph Purposes.....	Feb. 16, 1908
" Experimental Treatment of.....	Mch. 16, 1908

Rugh's Composite Telegraph and Telephone

System	May 1, 1908
Simultaneous Telephony and Telegraphy.....	May 16, June 16, July 1, Sept. 16, Nov. 1, 1908
Telephony for Railways.—W. E. Harkness.....	July 1-16, 1908
Train Despatching by Telephone.....	May 16, June 16, July 1, Sept. 16, Nov. 1, 1908
Wire Chief, How to Become a.....	Jan. 16, Feb. 1 and 16, 1908

By taking a little trouble, when Telegraph Age first comes to hand, it may be preserved to form a permanent and valuable addition to the reading matter of a kind which all telegraphers should be supplied. We furnish a neat and attractive cloth board binder, which will be sent by mail, prepaid, for \$1. It has good, strong covers, on which the name Telegraph Age is stamped in gold, and means by which each issue may be securely held as in a bound book. One binder may thus be made serviceable for a number of years, and when successive volumes, as they are completed, are bound in permanent form, the subscriber ultimately finds himself, for a moderate cost, in possession of a most valuable addition to his library, embracing a wide variety of telegraph, electrical and general information.

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.

Directory of Annual Meetings.

Association of Railway Telegraph Superintendents meets at Hotel Pontchartrain, Detroit, Mich., June 23, 24, 25, 1909.
Commercial Cable Company meets the first Monday in March, at New York.

Gold and Stock Life Insurance Association meets the third Monday in January, at New York.

Great North Western Telegraph Company meets the fourth Thursday in September, at Toronto, Ont.

International Association of Municipal Electricians meets at Young's Hotel, Atlantic City, Sept. 14, 15, 16, 1909, at a date to be named later.

Old Time Telegraphers' and Historical Association, will meet at Fort Pitt Hotel, Pittsburg, Pa., Aug. 17, 18, 19.

Postal Telegraph-Cable Company meets the fourth Tuesday in February, at New York.

Telegraphers' Mutual Benefit Association meets the third Wednesday in November, at New York.

Train Despatchers Association meets in 1909 at Columbus, O., June 15, 16, 17.

The stockholders of the Western Union Telegraph Company meet the second Wednesday in October, at New York; election of officers occurs on the third Wednesday in October.

Stray Electric Currents.

An interesting paper was recently read at the Manchester Institution by Messrs. J. G. and R. G. Cunliffe. This paper, says London Electricity, records the results of a number of tests on stray currents from tramway rails. In view of the fact that in all except the conduit system the return current passes through the tramway rails, it may appear a little strange that leakage currents from the rails have not resulted in considerable damage to pipes and other metal work in the ground. In America there has certainly been a great deal of trouble from this cause. Messrs. Cunliffe, in their paper, show fairly conclusively that the immunity from electrolytic troubles in England is due very largely, if not entirely, to the board of trade regulation, which limits the difference of pressure between any two points in tramway rails to seven volts. With such a limitation the authors of the paper show that practically no stray currents at all enter pipes and other metal work situated at a distance of three feet from the rail. It says a good deal, therefore, for the foresight of the board of trade officials in adopting this limitation of pressure, and while the authors of the paper consider that the rule is unnecessarily drastic, the general body of the profession are quite satisfied to let the regulation stand as it is, as quite saving in the cost of return feeders would be a small matter compared with costs that might be incurred due to the destruction of gas and water pipes, etc., if the regulation were relaxed.

Pole Statistics.

Statistics compiled by the United States Census Bureau give the following data regarding the poles used by the telegraph and telephone companies in the United States during the years 1906 and 1907:

	1907		1906	
	Number.	Cost at Average point of purchase. cost per pole.	Number	Cost at Average point of purchase. cost per pole.
Cedar	1,629,670	\$2,956,200 \$1.81	1,532,996	\$3,079,852 \$2.01
Chestnut	494,128	766,072 1.90	661,808	1,510,484 2.28
Cypress	22,081	24,647 1.07	21,395	36,559 1.71
Pine	48,963	47,497 0.99	121,699	478,427 3.93
Oak	66,422	23,100 0.35	2,980	1,500 0.50
Juniper	18,492	30,457 1.65	38,331	91,854 2.40
Redwood	8,952	15,313 1.90	7,140	24,399 3.42
Fir	6,991	3,964 0.59	9	94 10.44
Tamarack	12,827	6,615 0.52
All other	94,346	103,064 1.09	9,454	11,789 1.25
Total	3,311,651	\$3,977,619 \$1.72	2,395,722	\$5,234,049 \$2.19

It is estimated that two-thirds of the poles purchased are used for renewals and only one-third for new lines. Decay is the great cause of destruction of poles. It is estimated that approximately 95 per cent. are destroyed by this cause, and only 5 per cent. by breakage. The average life of untreated poles of all species is estimated at 13 years. This may be much prolonged by preservative treatment.

The practical side of the telegraph is discussed in every issue of *Telegraph Age* in a manner to interest and aid every individual operator in the service. Why not secure the benefits of such information by subscribing for the paper—\$2 a year.

The Planigraph.

We are in receipt from Spon and Chamberlain of a copy of "Herrick's Planigraph," which should prove useful to those who have to make calculations of conductors for electric circuits. By the aid of this device problems may be quickly solved which involve the amount of current, the length of the circuit, the drop in voltage and the size of wire required. Any three of these quantities being known, the fourth can be found immediately. The price of this planigraph is 50 cents, and orders may be addressed to J. B. Taltavall, Telegraph Age, 253 Broadway, New York.

The Phantophone.

During the past few years the British Insulated and Helsby Cables, Limited, of Liverpool, England, have directed their attention to the problem of designing apparatus which will permit of the application of telephones to existing telegraph and block signaling circuits of relatively short length, such as are usually met with on railway lines in England, as well as in other countries.

The result of their experiments is the "Phantophone," an instrument which is made in three distinct patterns, to suit the three sets of conditions generally met with, viz.: (a) The connection of a telephone circuit to a single-line telegraph or block signaling circuit; (b) the connection of a telephone circuit across two single-wire telegraph or block signaling circuits, each of the latter being worked independently, while the telephone circuit forms a metallic loop; (c) the connection of an earthed telegraph circuit to a metallic loop telephone circuit.

Miss Anna Jarvis, sister of Mr. C. S. Jarvis, formerly cashier of the Western Union Telegraph Company, at Philadelphia, is credited with having founded "Mothers' Day." The day set apart for this anniversary is the second Sunday in May, when, what is now rapidly becoming a national occasion will be marked this year by special services in many cities and by the wearing of the symbolic mothers' flower, the white carnation. Probably there was never before a movement inaugurated which in so short a time commanded such widespread attention and attained almost national recognition. The idea that on this day every one should think of mother and pay her tribute is in itself a beautiful thought. There is nothing more sacred and more touching in the world than the mother love.

The American Telephone and Telegraph Company, as a result of the recent blizzard in the vicinity of Washington, which so badly crippled telegraph and telephone facilities, has decided to push as vigorously as possible its underground system between New York and Washington. The underground plant of this company is already completed some distance south of Philadelphia. When finished to the capital underground telegraph and telephone facilities will be available between Boston and Washington, a distance of approximately 500 miles.



KERITE



Insulated Wires and Cables

KERITE has back of it an unequalled record of half a century of successful service under the most adverse conditions. It improves instead of deteriorating with age.

Efficiency and safety in electrical installations depend chiefly on insulation. For fifty years KERITE insulation has been the standard of excellence.

Results count. KERITE wires and cables installed half a century ago are in service to-day. The wonderful durability of KERITE insures the highest safety and economy.

Initial tests determine the properties of an insulation only at the time they are made. They do not determine how well it will do its work years afterward.

The indestructibility of KERITE and its power to resist deteriorating influences should be carefully considered in specifying an insulated wire or cable.

Experience of others should be useful to you. Insure your service by using KERITE.

KERITE INSULATED WIRE AND CABLE COMPANY

INCORPORATED BY W. R. BRIXEY

Sole Manufacturer

Hudson Terminal, 30 Church St.

NEW YORK

Western Representative

WATSON INSULATED WIRE CO.

Railway Exchange, CHICAGO, ILL.



The Railroad.

The Train Despatchers' Association of America, John F. Mackie, secretary and treasurer, 7042 Stewart Ave., Chicago, will hold its next annual convention at Columbus, Ohio, on June 15, 16 and 17.

Mr. Charles H. Gaunt, assistant general manager and superintendent of telegraph of the Atchison, Topeka and Santa Fe Railroad Company, has been appointed assistant general manager of both the Eastern lines and Western lines, with office at Topeka, Kan.

The Erie Railroad, E. P. Griffith, superintendent of telegraph, has installed a telephone train-despatching system on the district from Meadville to Corry, a distance of forty-one miles, single track, and the most difficult piece of road to operate on the entire Erie system.

Mr. Joseph B. Stewart has been appointed assistant to the general manager of the Erie Railroad, with headquarters at New York. Mr. Stewart is an old-time telegrapher, and has been identified with many railroad systems. He was at one time superintendent of telegraph and signals of the West Shore Railroad.

The Pennsylvania Railroad Company has established a school of electricity for employes on the middle division of its main line, and similar schools will probably be extended over the entire system. The aim of this school is to familiarize employes of the telegraph department with the working of interlocking plants. Instruction will be given in circuits and currents. This is said to be a preliminary step toward the final electrification of the system.

Thomas Fitzgerald, general manager and receiver of the Norfolk and Southern Railroad, died at Baltimore, March 28. For many years he was identified with the telegraph department of the Baltimore and Ohio Railroad, on which system he learned telegraphy in the late sixties. He rose from the operator's desk through the various departments to the position of general manager of the entire system, which position he held up to about a year ago.

A meeting of the eastern committee of the Association of Railway Telegraph Superintendents is announced to take place at Philadelphia on April 15. Mr. Charles Selden, superintendent of telegraph of the Baltimore and Ohio Railroad, Baltimore, Md., is the chairman of the committee, and he hopes that a full attendance will be present, as many matters of importance to the railway service will be brought to the attention of the meeting. Mr. William J. Camp, of the Canadian Pacific, Montreal, president of the Association of Railway Telegraph Superintendents, will be in attendance. Mr. J. B. Fisher, superintendent of telegraph of the Pennsylvania Railroad Company, Philadelphia, has charge of the arrangements.

The Association of Railway Telegraph Superintendents will meet at Detroit, Mich., in its twenty-

eighth annual convention on June 23, 24 and 25. W. J. Camp of Montreal is president, and P. W. Drew, superintendent of telegraph of the Wisconsin Central, Chicago, Ill., secretary. The latter official is prepared to answer any inquiries regarding the coming convention to those interested. Headquarters will be at the new Hotel Pontchartrain, the rates at which are as follows: Room for one person with running water, \$2 to \$2.50, with bath, \$3 to \$5; room for two persons with running water, \$3 to \$4, with bath, \$5 to \$8; rooms on parlor floor suitable for exhibition purposes for supply men, \$8 to \$20 per day. E. H. Millington, superintendent of telegraph of the Michigan Central, Detroit, Mich., is chairman of the committee on arrangements, and is making every effort to have the annual convention a success from a social as well as a business standpoint. He rightfully argues that "all work and no play makes Jack a dull boy." In a recent letter he has this to say:

"I will be glad if you will emphasize the coming meeting of the Association at Detroit, which I think should easily, for various reasons, be a banner one. As you know, interests and questions of greater value than ever to the railroad companies are being rapidly in large measure developed within the sphere of the telegraph departments, consequently discussions of as much and even greater value than those of last year, which were record breakers, will doubtless be in evidence at the coming meeting, and so far as the opportunities for entertainment are concerned Detroit offers for the members and their ladies unlimited facilities for enjoyment, particularly as regards river trips, which, as you know, are unexcelled the world over. The headquarters will be at the new Pontchartrain hotel, which is on the site of the old Russell House, immediately opposite the City Hall.

"It has been arranged that Friday, June 25, be given over to a trip to Port Huron and return, the Grand Trunk Railroad Company having kindly offered to place extra equipment on their train leaving Detroit at 10.45 a. m. Lunch will be had at Port Huron or Sarnia, and the party will be given opportunity to inspect the tunnel which a few months ago was changed over to electrical operation. At 3.45 p. m. the party will leave Port Huron by the magnificent steamer Tashmoo for a trip down the St. Clair River, through the flats, the Venice of America, across Lake St. Clair and down the Detroit River, arriving at Detroit at 8.30 p. m. This should prove a delightful outing and particularly on the palatial steamer abundant opportunity will obtain for the intermingling of the members in jollification and in groups, interchanging views on general matters incident to operations on their lines and for the discussion of important convention subjects, which in many respects proves of equal value with what is developed on the convention floor."

Telegraph Age is headquarters for electrical and telegraph books. Write for catalogue.

Radio-Telegraphy.

The wireless telegraph measure before the Dominion Parliament requires that all passenger boats carrying over 500 tons, and all freight vessels of over 1,500 tons, shall be equipped with a wireless outfit in charge of competent operators.

It is announced that drawings and plans have been completed and construction will begin at once at the balloon factory of Leo Stevens, in New York City, of a dirigible balloon, which will be controlled by means of wireless apparatus.

In order that the interference of wireless stations operated by private companies with those operated by the army and navy may be avoided, the Junior Wireless Club of New York City has petitioned the government to establish a definite wave length for army and navy wireless service.

Wireless telegraph stations for emergency use when telegraph and telephone lines are thrown out of commission by storms or other causes are being established by some concerns which depend largely on the telegraph. The Buffalo Evening News and the Pabst Brewing Company are among the companies which have recently established stations for this purpose.

A wireless telegraph outfit will soon be installed on the roof of the Auditorium Annex Hotel, in Chicago, by the United Wireless Telegraph Company. Similar equipments will probably be placed on hotels in several other large cities within a short time. The Waldorf-Astoria, in New York, and the Bellevue-Stratford, in Philadelphia, are already so equipped, and the messages are exchanged between them and also with vessels on the Atlantic.

The Boston Herald is installing a wireless receiving station on top of its building on Tremont street, facing the Common. The antennae will have a particularly favorable position, and will be connected directly with the regular telegraph room. The apparatus is of the same description as that used on the vessels of the United States fleet on their tour around the world, and can be attuned to any of the sending apparatus used by the vessels coming to the coast for a radius of five hundred miles.

An article on wireless telegraphy by F. Kiebitz, digested by the Electrical World, is a critical discussion of the principles of construction of wireless telegraph stations. The modern methods for producing high-frequency currents have such a high efficiency that any further increase of efficiency would not produce any considerable advance in wireless telegraphy. On the other hand, improvement may be made by selecting the dimensions of the transmitting system according to Drude's formulas. By using several antennae it is possible to send wireless telegraph messages in a certain desired direction without reducing the distance of transmission. For a receiving station it is advantageous to couple a non-periodic detector circuit with the antenna circuit by magnetic induction.

The Eiffel Tower will shortly be enabled to receive from the Paris Observatory the exact time, which it will transmit to all ships in wireless communication with it.

The Great Northern Railway Company's steamer "Minnesota," which is the largest merchant vessel under the American flag, left Seattle for the Orient on March 20 equipped with a three-kilowatt outfit manufactured by the United Wireless Telegraph Company.

The Canadian Pacific Railway has awarded the contract for the equipment of its Victoria-Skagway steamer, "Princess May," to the United Wireless Telegraph Company. This is the first of the Canadian Pacific Railway's coastwise steamers to be equipped.

Professor Elihu Thomson states that in recent tests of the wireless telephone system developed by Professor R. A. Fessenden, the Navy Department failed to interfere with the telephonic waves. He added that he confidently believed that in a short time talking by wireless telephone will become a feature of everyday life.

A patent, No. 916,428, for wireless signaling has been secured by R. A. Fessenden of Washington, D. C. The vessel or receptacle has a diaphragm provided with a perforation whose wall is formed of refractory material and a constant flow of liquid is forced through the perforation, thus avoiding fouling by slight particles of dirt which are carried therethrough.

A patent No. 916,429, for a receiver for electromagnetic waves, has been issued to R. A. Fessenden, of Washington, D. C. A stream of liquid coming from a nozzle impinges on the diaphragm and forms the receiver.

A patent, No. 916,483, for a combination wireless telegraphy instrument has been granted to J. E. Ostrander of Staatsburg, N. Y. An improved coherer in which the passage of the current through the coherer operates the sounder and completely breaks all circuits passing through the coherer which produces an effective decoherence.

The Canary Islands will shortly be placed in communication by wireless telegraphy with Europe, Africa and America. The principal station will be in Grand Canary, with a radius of 1,800 miles. Stations will also be established in Teneriffe, and in the other islands, for the purpose of interinsular communication. The contract has been given by the Spanish government to a French company.

The United Wireless Telegraph Company has begun the erection of a three-story building in Seattle for the manufacture of wireless telegraph instruments. The machinery to be installed is estimated to cost about \$8,000. Two representatives of this company left recently for the Orient, where they are to install instruments. Efforts are to be made by these men to establish a transpacific wireless record.

A patent, No. 915,993, for wireless telegraphy has been taken out by J. Murgas, Wilkesbarre, Pa. The antenna extends into the earth and is insulated therefrom and is arranged in a helix. A capacity is arranged on the other side of the apparatus.

A patent, No. 916,541, for a variable inductance winding, has been secured by M. Eastham of Boston, Mass. For wireless telegraphy to avoid breaking the circuit when the slide passes from turn to turn. Provides a plurality of wires, preferably of different lengths, connected into one side of the circuit so that the slide bridges from a turn of one wire to the corresponding turn of the other wire without breaking the circuit.

A patent, No. 916,895, for space telegraphy has been taken out by John S. Stone of Cambridge, Mass. Avoids interference, particularly static interference, even in cases where the condenser is serially included in the elevated conductor, by providing protecting means across the condenser which has an impedance so much greater than that of the condenser that it operates as an open circuit.

Instructions have been issued by the wireless telegraph department of the Dominion government to the effect that after April 1 the universal alphabet alone will be used. Hitherto the American Morse figures have invariably been used, while the letters have been almost always transmitted in the universal alphabet. This practice was contrary to the spirit of the Berlin convention and gave rise to difficulties when working with Oriental and other vessels whose operators used the universal alphabet only.

Mrs. R. H. Tucker, who is wireless operator on the steamer "Indianapolis," plying between points on Puget Sound, is said to be the first woman wireless telegraph operator stationed on a ship. Mrs. Tucker, who, before taking up wireless work, was employed by the Western Union Telegraph Company at Spokane, is her own electrician, being able to make all necessary adjustments or repairs to the apparatus. She is the wife of former manager R. H. Tucker, of the Western Union Spokane office, who resigned some time since to accept a position with a wireless company at Portland, Ore.

The Massie Wireless Telegraph Company claims the world's record for long distance wireless transmission. On July 24, 1908, communication was established between the United States navy's wireless station at Point Loma, Cal., using the Massie system, and the battleship Connecticut, which was then 2,900 miles distant. The best record previous to this, they also assert, was made by the steamship President, also equipped with the Massie System, when they communicated with San Francisco, Cal., from a distance of 2,650 miles.

A Marconi wireless telegraph operator from one of the German liners was arrested recently in Jersey City for carrying a revolver. "Jack" Binns appeared in court to plead the case of his brother

telegrapher, and the judge released him, advising him to leave his gun at home the next time he visited this country, and that if he should get into trouble to send out the C. Q. D. message to the police. The prisoner, after thanking the judge, said that this was his first visit to this country and that he was given to understand that Indians were still plentiful on our shores.

Radio-Telegraphy as a Profession for Operators.

To those operators who have family responsibilities and are without special technical knowledge or training, wireless telegraphy at present offers no attractions in the way of adequate remuneration. For the young unmarried operator of good education, however, the matter is one worthy of careful consideration.

In the first place a thorough knowledge of the universal telegraph alphabet is essential since the ratification by most countries of the Berlin wireless telegraph convention involves its use. A clear and neat handwriting, devoid of flourishes, is also very desirable. The pay at present ranges from \$40 to \$60 per month, with board and accommodation on vessels, and from \$40 to \$75 or \$90 per month, usually with accommodation, at shore stations.

The remuneration, it will be seen, is not high, but the young operator should bear in mind that he will have opportunities of seeing the world and will be constantly in contact with the traveling public. These are educational factors of considerable importance.

Further, a special dignity attaches to wireless operating since it is less mechanical and subject to less supervision than ordinary telegraphy, giving the operator a sense of personal responsibility which adds zest and interest to his work. He will have much time for reading and study and his prospects of promotion will depend upon the use which he makes of these opportunities.

The successful wireless operator is the one with ready ability to associate cause and effect; who can think independently and be guided by the spirit rather than the letter of his instructions. This implies dexterity of head as much as of hand. As an applied science wireless telegraphy is still in its infancy and as an organized means of safeguarding navigation and regular communication between ship and ship and ship and shore, it is hardly out of its youth. When, as will some day necessarily be the case, the governments take definite steps to evolve order out of the existing wireless chaos, incident to the confusion arising from competing companies, the status of the science and of the operator will at once be established and probably enhanced. Those in charge of wireless plants will then receive salaries more commensurate with their responsibilities and qualifications.

Subscribe for Telegraph Age, \$2.00 per year.

Telegraphers' Aid Society Election.

The annual election of the New York Telegraphers' Aid Society took place on March 30, resulting as follows: President, Robert J. Marrin; vice-president, H. C. Worthen; treasurer, T. M. Brennan; financial secretary, C. A. Killoyle; recording secretary, Miss M. E. Saunders; members of executive committee, E. F. Howell, J. A. Hill, Miss S. Lougherty, E. E. Brannin, E. Mesler, J. F. Zeiss, A. J. Gillman, C. J. Lemaire, J. J. Riley, T. J. Smith and H. M. Heffner; auditing committee, J. F. E. Hopkins, W. T. Rogers and F. J. Nurnberg.

The statement of the society for the year ending March 6 is as follows:

Balance on hand March 6, 1908.....	\$21,148.56	
Receipts:		
From dues	\$5,634.00	
From initiation fees.....	85.00	
From interest	1,412.26	7,131.26
Total		\$28,279.82
Disbursements:		
Sick benefits	\$3,242.75	
Death benefits	1,400.00	
Expenses	728.22	\$5,370.97
Balance on hand, March 6, 1909.....		22,908.85
Total		\$28,279.82

Relief Fund.

Balance on hand, March 6, 1908.....	\$4,069.72
Receipts	600.88
Total	\$4,670.60
Disbursements	\$334.28
Balance on hand, March 6, 1909.....	4,336.32
Total	\$4,670.60

The New Birmingham Postal Office.

One of the wits of the Birmingham Postal force whose operating department was recently moved to the sixteenth floor of a skyscraper in that city, writes as follows: "When the force assembled in the new and lofty quarters for the first time we sung 'Nearer, My God, to Thee.' We feel somewhat 'stuck up' now and look down on the Western Union with pity. They were once our best friends and kept us out of the poorhouse a long time. By the way, it may not be generally known, but we have several 'Colonels,' a 'Major,' two 'Bishops' and an 'Angel' on our force now, only one 'Cain,' and he is able to be good."

New Western Union Office at New Bedford.

The Western Union Telegraph Company, W. F. McClure, manager, New Bedford, Mass., has removed its main office from 148 to 151 Union street, where an up-to-date office has been established to take care of the business needs of the community. Manager McClure has the following force: T. Meaney and H. C. Crowley, operators; I. Veeder, bookkeeper; M. Zeman, clerk.

New Edition of Phillips Code Now Ready.

The new edition of Phillips Code, revised and brought up to date (March 16, 1909) is now ready

for delivery. The popularity of the Phillips Code, by Walter P. Phillips, was never more apparent than at the present time. Its acceptance by the telegraphic fraternity, as a standard work of the kind, dates from its first publication, and the constantly increasing demand for this unique and thoroughly tested method of shorthand arranged for telegraphic purposes, has necessitated from time to time the issuance of several editions. The present edition was carefully gone over under the supervision of competent authorities. This "staunch friend of the telegrapher" is strictly up to date in every particular. It is declared that an essential qualification of a "first-class operator" is a thorough understanding of Phillips Code.

The price of the book is \$1 per copy. Address all orders to J. B. Taltavall, Telegraph Age, 253 Broadway, New York.

The Saving Habit.

The first lesson a man is given to learn when he enrolls in the school which qualifies for success is to put by part of his salary every week. The truest friend in times of adversity is the bank account and the surest foundation upon which to build a fortune is the accumulated savings of months and years. The habit of putting money away, says the Express Gazette, is reflex in its action. The money itself is a valuable accessory, and the quality of mind and character developed through this habit makes for ultimate success. The man who can calmly pass by the tinsel and glitter of civilized life, whose money is not drawn from his pockets by every tinkling sound, is a man who will have small cause for complaint at the world's treatment. He will develop beyond the influence of triflers.

A man who cannot withstand trivial temptations to spend money has not in him a stiff enough backbone to make a success of any venture. He could be turned aside from his undertaking by the first bauble that caught his eye, like some infant enthralled with a toy balloon. The stores, the streets, the places of amusement, all furnish temptation to a young man to part with his money. If his ideal, the purpose within him, is not stronger than those outside inducements his salary will be frittered away on unnecessary expenditures, and his life will be a failure. It is the order of mind such a course of action indicates that spells failure, not the mere fact of being without money, though the possession of a small sum of money has often made ultimate success possible.

Reynolds Arcade, one of the landmarks of Rochester, N. Y., and in which the Western Union Telegraph Company's main office was located, was destroyed by fire March 30.

The telegraph office was established in this building, which was erected in 1825, in the latter part of 1846, about the time that the first telegraph line was constructed through the state, and which was known as the New York, Albany and Buffalo Telegraph Company.

LETTERS FROM OUR AGENTS.

PHILADELPHIA, POSTAL.

The following changes have been made recently in the personnel of this office:

Mr. M. A. Baker, night wire chief, has succeeded Mr. Miles E. Dunn as day wire chief, Mr. Dunn having retired from the service.

Mr. John Zecher has been appointed night wire chief to succeed Mr. Baker.

Mr. Harry Riskie, clerk at the Bourse Building office, has been promoted to be operator at that office, to succeed Mr. Fred Fix, who has resigned.

DETROIT, WESTERN UNION.

The departure from this city of Mr. Fred J. Dayman to assume the chief operatorship of the Cleveland, Ohio, office of the company was not the most pleasant affair of his life. In his twenty-five years of service at Detroit he had become a general favorite with every member of the force, who, on the eve of his departure presented him with a diamond stud as a token of their esteem. Mr. Dayman, on receipt of the beautiful gift, with difficulty suppressed his emotion long enough to thank the donors. The presentation was made by chief operator John McArdle, who made a few very appropriate remarks, coupled with the well wishes of all his associates. The affair was one that will long be remembered by the new Cleveland chief operator. Mr. Dayman is a member of the Old Time Telegraphers' and Historical Association, and the few other members of the association in Detroit were deeply grieved at his leave-taking. Every member of the profession in Detroit unites in congratulating the Cleveland operating department on obtaining as its executive head a gentleman of sterling integrity and manly worth.

Obituary.

Alvin S. Brown, an old-time telegrapher, died at Buffalo, N. Y., February 28, aged sixty-six years.

Elmer R. Joy, Associated Press telegraph department, Cincinnati, O., died of asphyxiation by gas at Gary, Ind., on March 8.

Lester A. Hanson, aged thirty-five years, manager of the Postal Telegraph-Cable Company, at Biddleford, Me., died at that place on March 30.

J. B. Booth, an Associated Press telegrapher, employed at Omaha, Nebraska, until a year ago, when he went west for the benefit of his health, died at Gooding, Idaho, March 21.

David Pell Secor, an old personal friend of Professor S. F. B. Morse, and who assisted him in putting together the first telegraph instrument, and an artist whose work is in the Metropolitan Museum of Art, died, March 30, in Bridgeport, Conn., at the age of eighty-five years.

M. Laberge, who recently died at Quebec, at the age of sixty-eight, was a member of the Collins overland expedition, which was organized in 1865

by the Western Union Telegraph Company to connect America with Europe telegraphically, via Alaska, Fering Straits and Siberia.

W. H. Bofinger died at New Orleans, March 15. He was the founder of a local telegraph company connecting all the cotton presses with the commercial district. He also founded the American District Telegraph Company and established the first telephone system in New Orleans. He was sixty-eight years of age.

Mrs. Eliza Curtiss Prescott, widow of George Bartlett Prescott, who patented several inventions in connection with the telegraph, and who was the first and for many years electrical engineer of the Western Union Telegraph Company, died at Atlantic City, N. J., March 3. Mr. Prescott died in New York, January 18, 1894. He was a joint owner with Thomas A. Edison of all the quadruplex patents in this country and on the continent of Europe. He was the author of many text-books on the telegraph.

Miss Annette F. Telyea, 69 years of age, of the Western Union Telegraph Company, Boston, Mass., died in that city, March 7. For nearly a half century Miss Telyea, who was a native of Kentucky, had been a telegraph operator, and was well known in telegraph circles in the east. During the civil war she was in charge of the government station at the Readville, Mass., recruiting camp, and afterward for nearly twenty years was manager for the Western Union at Dedham and at Canton Junction, Mass. For the past fifteen years and up to two weeks before her death she had been employed in the main office of that company in Boston.

Italian Telegraph Statistics.

The telegraph system of Italy at the end of 1906 totalled 47,885 kilometers of line and 204,797 kilometers of wire. The system of submarine cables consisted of 4,011,886 metres belonging to the state and private companies. The total number of telegraph offices open in 1906 was 7,444. Altogether 7,701 instruments were employed, besides 4,355 accumulators. The traffic comprised 9,141,503 forwarded private inland messages handled by the government offices; 626,174 private messages handled by the railway telegraph offices, and 1,361,509 messages sent to foreign places. There were also 3,226,318 official and service messages, making a total of 14,355,504 messages forwarded. Messages received totalled 19,634,501, of which 18,239,251 were inland and 1,395,250 were received from foreign countries, and together with 35,180,884 telegrams passing in transit, the traffic altogether amounted to 69,170,889 telegrams. During the year under review 1,226 radio-telegrams were transmitted and 1,962 received by the various wireless stations.

Telegraph Age is the leading journal of its class in the world, and should be in the hands of every progressive operator; \$2 a year.

General Mention.

The Canadian Electrical Association will meet in annual convention at Quebec on June 16, 17 and 18.

The Telepost Company of New Jersey has been incorporated with a capital of \$10,000 by H. Lee Sellers, Thomas Conyngton and R. H. Sellers. The company is to construct and operate telegraph and telephone lines.

The Northern Commercial Telegraph Company of Canada has awarded the contract to build a thousand miles of telegraph and telephone line from Point Levis, Que., to Windsor, Ont., and construction work will be started at once.

Mr. Conrad A. Meyer, wire chief of the eastern division, Western Union Telegraph Company, New York, who was twice elected Master of Amity Lodge F. and A. M. was the recipient of a very handsome and valuable token of esteem, from the members of the lodge on the evening of March 25.

The officers of the People's Mutual Telegraph Company, an Illinois corporation, which, as stated in our previous issue, has been granted a franchise to run its wires in the city of Chicago, by the common council of that city, are: president, Arnold Kalman, Chicago; vice-president, H. C. Stifel, St. Louis; secretary-treasurer, H. L. Stern, Chicago.

Mr. F. E. Rudenauer, for many years actively engaged in the commercial telegraph business, and for the past several years floor manager for Lamprecht Brothers and Company, bankers and brokers, of Cleveland, Ohio, has associated himself in partnership with Roland T. Meacham, member of the Cleveland Stock Exchange, and will conduct a brokerage business in the Citizens' building, that city.

Mr. W. B. Eddy, of Albany, N. Y., an old-time telegrapher, but now in the telephone service, in a recent letter, says: "Telegraph Age is a welcome visitor and a source of satisfaction in keeping up one's acquaintance with the 'old guard.'"

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.

J. B. Taltavall, TELEGRAPH AGE, 253 Broadway, 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.

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

When the banking department of the state of New York expresses praise for the thorough, businesslike management of the Serial Building Loan and Savings Institution, it is positive evidence that it is a safe place of deposit for the earnings of telegraphers. Personal calls or inquiries addressed to the office at 195 Broadway, New York, will receive prompt attention.

Telegraph Superintendents.—Are your telephone despatching systems giving satisfactory service? Do you need an all around telephone and telegraph man to put them in first-class condition and maintain them? Will be at liberty May 1, 1909. Address H. C., care Telegraph Age, New York.

For Sale—Twentieth Century Key. Brand new. Had no use for it after purchasing. Make offer. Address Twentieth Century, care Telegraph Age, New York.

Leg Pattern \$3.50
Legless Pattern 4.00
F.O.B. Columbia, Pa.

THE LEFLEY KEY

The Best Key on the Market for Business and Profit. Because it does not stick; is durable; speedy; insures fine clear-cut Morse; an easy sender.



Send draft, express or P. O. Money Order.

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Columbia, Pa. - R. F. D. No. 1

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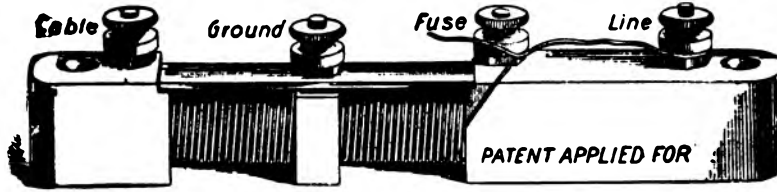
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