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SOME POINTS ON ELECTRICITY.

The Dynamo—Series, Shunt and Compound Wound.

Part III.

BY WILLIS H. JONES.

For telegraph and other circuits arranged in parallel it is obvious that the value of the electromotive force of the dynamo which feeds them must remain constant regardless of the number of such circuits which may be connected at any given period. Otherwise the alterations in the value of the joint resistance of the variable number of conductors comprising the external circuit will cause the electrical pressure to drop or rise, as the case may be, to such an extent that the current value in each wire will fluctuate in volume and thereby become useless for telegraph apparatus. To avoid this contingency shunt wound machines are employed. The normal voltage of the dynamo is preserved by means of the shunt.

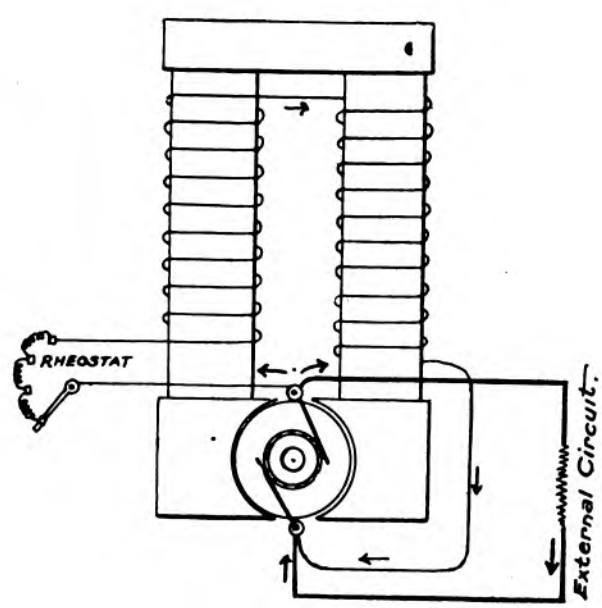
SHUNT WOUND MACHINE.

A glance at the accompanying diagram, Fig. 1, will show that the armature and the field magnet coils are connected in parallel. By this method part of the current generated by the machine passes through the field coil for the purpose of creating magnetic lines of force to be cut across by the rotating armature coil.

The field magnet coil, or shunt as it is called in these machines, is composed of a great many turns of comparatively fine wire, the resistance of which, together with that of the rheostat connected in series therewith, is so proportioned that a field density will result which will consist of the correct number of lines of force required to create the desired value of electromotive force when the machine, unloaded, is running at normal speed.

When the machine becomes loaded, that is to say, feeding current to external circuits, the reaction set up in the armature due to the current flowing through its coils causes a slight drop in the electrical pressure owing to the diminished strength of the field magnet.

In order to gain compensation for this loss a sufficient amount of artificial resistance must be



SHUNT WOUND.

FIG. 1.

cut out of the rheostat to restore the required magnetic strength of the field by causing a greater volume of current to flow through the shunt.

The regulation of the rheostat may be accomplished either by hand, or automatically by means of a controlling magnet placed in series with the line circuit. For telegraphic purposes, however, it is usually done by hand as the drop in electromotive force between no load and full load should

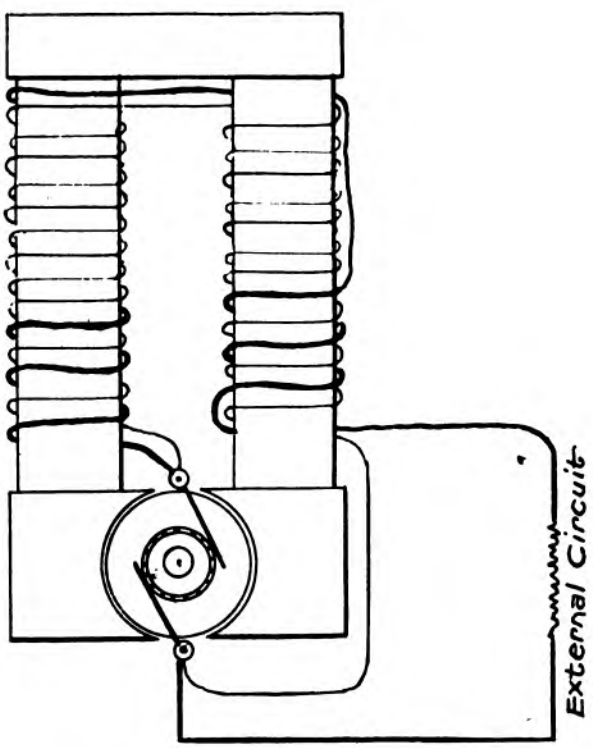
not exceed five per cent. in a properly proportioned shunt wound machine.

Telegraph apparatus in parallel circuits, therefore, would hardly be affected by so slight an alteration in electrical pressure. Shunt wound dynamos, it may be said, are practically constant potential devices and are also employed quite extensively for incandescent electric light circuits.

COMPOUND WOUND MACHINE.

Where very large volumes of current are demanded for electric lighting purposes the opportunities offered for great alterations in value arise so frequently and, at times, suddenly that it is preferable to compensate for the same automatically rather than depend upon the vigilance of the dynamo attendant.

This end is attained by the compound winding



COMPOUND WOUND.

FIG. 2.

shown in Fig. 2. It will be seen that the winding is the same here as in the ordinary shunt machine with the exception that a few turns of very coarse wire, indicated by the heavy lines, are also wound around the magnet over the fine wire field coil. These few turns are placed in series with the external circuit and are so proportioned that the volume of current it adds to or subtracts from the total magnetizing energy of the field magnet due to alterations in the volume of current in the main line is just sufficient to compensate for any loss or gain the field would otherwise be subjected to.

(Concluded.)

[Important articles by Mr. Jones, appearing in back numbers, dating from January 1, 1904, copies of which may be had at twenty-five cents apiece, are as follows: A Useful and Simple Testing Device, January 1, 1904; The Bad Sender, His Past and Future, January 16; The Transmitting Typewriter Wire Connections, February 16; A New Transformer for the Alternating Current Quadruplex (J. C. Barclay, patent), March 1; Definitions of Electrical Terms—Unabridged, March 16 to April 16, inc., June 1 to July 16, inc.; The Future Quadruplex (S. D. Field's invention), May 1-16; The Ghegan Multiplex, August 1; Proper Adjustment of Telegraph Apparatus, August 16-Sept. 1; Practical Information for Operators, October 1 to Dec. 1, inc.; Switchboard Practice at Intermediate Stations, December 16; Definition of the Terms Cycle, Period, Frequency, etc., Diagrams Interpreted, January 1, 1905; Lessons from the December Storm, January 16; The Bonus Wire, February 1; A Few Useful Methods, February 16; Co-operation, A Hint for Wire and Quad Chiefs, March 1; Measuring Resistance by Voltmeter Alone—Something About Ground Wires, March 16; Elementary Information Concerning Household Electrical Appliances, April 1 to May 1, inc.; The Barclay Printing Telegraph System, May 16; Polarized and Self-Adjusting Relays for Single Line Circuits, June 1; Limitations of Quadruplex Circuits, June 16; Electric Power From the Clouds, July 16; Concerning Condensers and Retardation Resistance Coils, August 1; District Call Box Service, August 16; The Art of Studying, Sept. 1; Other Methods of Splitting a Loop, Sept. 16; The Sextuplex, Oct. 1; A Few Questions Answered, Oct. 16; Positive and Negative Currents, Nov. 1; The Education and Evolution of a Chief Operator, Nov. 16; A Study of an Electric Circuit—Definition of the Principal Terms of Factors Which Regulate its Practical Output, Dec. 1; The Telephone—First Principles, Dec. 16, and Jan. 1, 1906; Questions Answered, Jan. 16.]

The Old Western Union-Bell Telephone Contract.

Advices from Boston state that the long-drawn-out case of the Western Union Telegraph Company vs. American Telephone and Telegraph Company for an accounting involving from $2,000,000 to $4,000,000 has been before Everett W. Burdett as master for two years, and in that time only one side of the case has been heard—namely, the evidence of the Western Union, remarks the Electrical World. The Western Union Company completed its evidence a month ago, and it is expected that the American Telephone and Telegraph Company will at once proceed to present its evidence, in which event a report to the court may be made this summer.

The present case has been in the court in one form or another for twenty-two years, and doubtless it will be some time before a conclusive decision is reached. The Western Union Company seeks an accounting for certain shares of stock in the companies licensed by the old Bell Telephone Company under a contract entered into in November, 1879. The defendant was then known as the National Telephone Company. Under this contract the Western Union Telegraph Company was to go out of the telephone business and turn over all its telephone property and exchanges to the Bell Company, the latter agreeing not to interfere with the telegraph business. The Bell Company in consideration was to pay the Western Union upon all telephones used in the United States under license from the Bell Company a royalty, or bonus, of twenty per cent. for the term of seventeen years. After the contract was made, however, the Bell Company began to give exclusive licenses to sub-companies in various parts of the United States, in consideration of which the companies gave the Bell Company a certain percentage, generally thirty-five per cent. of their stock, as a payment for the license. It is in respect to this latter mode of procedure that the Western Union is securing an accounting.

The Automatic Telegraph as a Public Utility.

BY ROMYN HITCHCOCK.

Means of distance communication are a most distinctive feature of advanced social and business life. The postal service has attained a high degree of development, while we also enjoy, although in a far lesser measure, the benefits of the telegraph and telephone. It is natural that letter communication should develop most rapidly, but it is remarkable that the most speedy of all means of communication should have made but comparatively little advance in method, in half a century. If the possibilities and benefits of rapid, cheap electrical communication had been early recognized by the people, all would now enjoy a means of exchanging letters in an hour or so, regardless of distance.

Unfortunately, even now the telegraph is not regarded as an universal utility, and therefore it has not felt the stimulus of a popular demand for rapid and cheap service. To the extent that it has become a necessity within a limited range of business, as for exchange and brokerage transactions, and for particular affairs requiring urgency it has become admirably adapted to these uses. The course of its development has been along restrictive lines, whereby its expansion into a great public utility has been prevented. It has been improved with special regard to the particular interests or demands which it serves so admirably in its present form, regardless of its greater applications and possibilities. The magnitude of the telegraph business is not large relative to the population or to the correspondence of any country.

The larger telegraph possibilities have not been generally recognized by either telegraph authorities or the people. So long as the methods in use suffice to transmit all the messages offered, managers see no reason for any great expansion of facilities by the use of superior methods. Well content with a limited business derived from a comparatively small number of persons who can afford to pay the charges, supplemented by the exactions from a still smaller number who use the telegraph only in emergencies which make it necessary, there seems no inducement to assume the expense of radical changes merely to favor a larger public. Therefore, while Morse key apparatus has been brought to a high point of excellence, the costly conducting system of wires is only utilized at the slow speed of hand transmission.

The assumption that because the apparatus in use suffices to do the business offered, therefore the limit of telegraph communication is already practically reached, is evidently false. It would place telegraphy in the unique position of an art which cannot be extended by improvement and cheapening. What is needed is not additional wires to increase facilities, but new methods and forms of apparatus which will effect very large economies, principally by utilizing conductors up to their full carrying capacity and reducing the number of wires, incidentally by increasing the efficiency of the operating force.

A considerable reduction in the number of wires leads to economies of great importance. Not only is there a great saving in capital investment in copper and other items, but the stronger construction of lines, bp reducing the weight and strains upon poles, also their height, not only cheapens the construction but materially affects the cost of maintenance. At the same time, interruption of communication due to damages from storms, will be reduced to a minimum and almost eliminated. For while it is impossible to put seventy-five or one hundred wires on a line of poles which will stand up against a bad windstorm, it should not be difficult to string half a dozen wires on short poles which will withstand any vicissitudes of weather.

While the importance of increasing the working capacity of wires has long been recognized, it is to be noted that progress in this direction has been mostly confined to means of increasing the number of messages that can be simultaneously sent over one wire by a number of operators using the Morse key, to the neglect of the much more important problem of attaining the highest speed of signaling. It is truly remarkable how this tendency to keep speeds down to hand working persists. Consider the bearing of this fact in the light of capital investment: A wire coasting $30,000 is capable of carrying 1,000 words a minute, but the practical limit of quadruplex handsending is sixty words! Moreover, along with this increase in transmission speed there is certainly a doubling of the efficiency of the operating force, and an accuracy far beyond that of direct manual operation.

Telegrams may be broadly divided into two classes. In the first class belong those which require instant attention at both ends of the line, such as can only be given by operators in a constant communication with each other. To this class belong messages of brokers dealing in stocks, grain, etc., during the hours of active business on the exchanges, orders for train despatching, and certain particularly urgent communications. Each message is in the highest degree urgent and seconds of time are valuable. Such messages take precedence over other business. For these multiplex Morse working is highly advantageous, since several operators can be in constant communication over a single wire.

To the other class belong the great mass of ordinary commercial and social telegrams, which are not so quickly handled. It is for these, and also for a vastly greater number of communications which do not now go by wire, but which would if the cost were low enough, that high-speed automatic working is required, and to these the arguments here made particularly apply.

The duplex, quadruplex and the well-known Delany multiplex represent successive steps in multiplex evolution. In these, and in some later

devices, there is a limitation in speed for each pair of operators determined by the Morse key, which in practice is less than twenty words a minute. The editor of the "Electrotechnische Zeitschrift" pubiished some comparisons of telegraphic speeds some time ago, giving the speed of Morse working at fifteen words a minute, the output of each operator being therefore seven and a half words a minute. In this country the quadruplex engages eight operators, four sending and four receiving, who together do not averaeg over sixty words a minute. Therefore, while multiplexing a wire materially increases its earning capacity, the commercial efficiency of employees remains remarkablly low.

This is no disparagement of the ability or faithfulness of operators. It is the actual commercial measure of their work, the average of telegraph key operating. And this is the result of half a century of development, a limitation of primitive, inefficient and imperfect hand manipulation. It represents the policy of private, monopolistic control, in the highest degree exemplified in the slow and unsatisfactory service of the United States. In other applications of electricity, as for light and power distribution, the economical use of expensive conductors is a prime factor in successful business. But the individual telegraph operator works no more speedily to-day over a wire than in the time of Professor Morse.

If communication by wire had developed in proportion to the development of railroads, for example, with corresponding demands for economical operation and low charges, hand methods would have been superceded years ago. Such development has not taken place because the idea of using the electric current for letter correspondence, or for any other purpose in communication than the transmission of messages at a high price for a small number of words, to be instantly delivered by special messenger, has not been grasped by the public. The notion has universally prevailed that telegraphic communication is necessarily expensive—that it must always be a restricted, emergency service. The idea of making electrical communication cheap so that all can afford to send letter-telegrams—messages of fifty or one hundred words—of business or social character, is opposed to ordinary conceptions.

(To be Continued.)

The Circuit Protecting Relay.

Among the more recently invented telegraph instruments is one which combines a small clock and a relay. This machine is designed to be placed in each office on the division of a railroad and connected to the train wire in place of the ordinary relay.

The circuit protecting relay is so constructed that the movements of the armature cause a small bar to move between the meshes of a wheel of the clock, and after the relay has been continuously on open circuit for a given length of time, as one minute, a catch is released. This allows a series of contact points, which have been held apart, to come together in pairs.

One of these pairs is connected in series with an electric bell and battery. The others are connected to the binding posts of the switchboard where the line wires enter. When these contacts are together, the circuit of the cell is complete, and each line wire connected to this instrument is cut out of the office because the resistance of the wires from the board through the contacts is less than through the relays.

The result is that if a telegrapher fails to close the key of the train wire at the end of one minute each machine will act, cut the wire out of each office and start all bells ringing. If he happens to be out of the office no delay is occassioned to the handling of business on the wires, except that every office is cut out until the catch is replaced in its original position by each telegrapher. If the trouble had been caused by a plug falling out of the switchboard the result would have been the same. When the bell rings the operator naturally examines his switchboard and instruments in his office to see if the trouble is there; if not, the catch is replaced and business resumed.

If a wire other than the train wire is open, it may be closed by holding the train wire open the required time, for this will cut all wires out of each office until the telegrapher at that office inspects his instruments and replaces the catch. —C. G. Hadley, in The Railroad Telegrapher.

Wireless Telegraphy.

Lee De Forest, the well-known inventor of the wireless telegraph system bearing his name, was married to Miss Lucile Sheardown at the St. Regis Hotel in New York on February 17.

It is stated that Canada possibly leads the world in the utilization of wireless telegraphy as applied to signaling ships at sea. The marine department has now in operation 10 high-power and three low-power Marconi stations. The high-power stations cover the entire Gulf of St. Lawrence and the Atlantic Coast waters far seaward from Newfoundland to the Bay of Fundy.

The Panama Railroad has authorized the Atlantic De Forest Wireless Company to instal its wireless telegraph system on the steamers Advance and Finance, so that the whole fleet now plying between New York and Panama will thus be equipped.

The International Telegraph Construction Company has been awarded the contract at $19,500 for furnishing six sets of wireless telegraph apparatus for the navy department.

By license of the postmaster-general, the Midland Railway Company of England is conducting a series of experiments in the vicinity of Derby to determine whether wireless telegraphy can be used in connection with its fast-train service between London and the north.

Report of the Mackay Companies.

The annual report of the trustees of the Mackay Companies was issued on February 15, and is as follows: The Mackay Companies owns the whole or part of the capital stock of seventy-four prosperous cable, telephone and telegraph companies in the United States, Canada and Europe, including the entire capital stock of the Commercial Cable Company and the various companies constituting the land line system, known as the Postal Telegraph. The Mackay Companies is one of the largest stockholders in the American Telephone and Telegraph Company, commonly known as the Bell Telephone Company. During the past year The Mackay Companies has acquired the control of the North American Telegraph Company, which for twenty years has owned and operated a telegraph system in Minnesota, Wisconsin, Iowa and Illinois, the stockholders of that company having exchanged a portion of their stock for preferred shares in the Mackay Companies.

The Mackay Companies has no debts.

Its authorized capital is $50,000,000 preferred shares and $50,000,000 common shares, of which there are outstanding $40,645,600 preferred shares and $41,380,400 common shares. During the past year the outstanding common shares have not been increased. The preferred shares have been increased by $4,676,900, issued in exchange for stock in corporations, which, in addition to strengthening the position of the Mackay Companies, pays as much or more dividends than the corresponding dividends on the Mackay Companies' preferred shares. The Mackay Companies, in its investments, confines itself to first-class cable, telephone and telegraph stocks.

Quarterly dividends of one per cent. have been regularly paid on the preferred shares, beginning April, 1904, and semi-annual dividends of one per cent. have been regularly paid on the common shares, beginning January, 1905.

The income of the subordinate companies of the Mackay Companies is largely in excess of the amount required to pay these dividends, but its policy is to obtain from its subordinate companies only enough money to meet the dividends on the Mackay Companies shares. All surplus earnings are left in the treasuries of the subordinate companies for extensions and the development of the business and the increase of reserves.

During the year 1905 the earnings of the Commercial Cable Company have shown substantial gains in gross receipts and net profits, on both the ocean and land systems. After paying the dividends on its stock, a large amount remaining was carried to reserve, in accordance with its long-established policy. That company has, in addition, completed and put into operation a fifth submarine cable to Europe, and also established cable connections with Newfoundland, the business of which has been heretofore exclusively handled by other companies. The Commercial Pacific Cable Company has completed arrangements for laying submarine cables to Japan from Guam, and to China from Manila, to be put into operation on or before April 1, 1906. The land line system (the Postal Telegraph) is being constantly extended, and shows increased gross receipts and net profits over the previous year.

The shareholders of the Mackay Companies in meeting assembled, at Boston, Mass., on June 15, 1905, by a vote of over four-fifths in interest of each class of shareholders, amended the Agreement and Declaration of Trust, under which the Mackay Companies was organized, so that the shareholders shall annually elect the trustees and the trustees shall annually make reports to shareholders.

The trustees of the Mackay Companies are: Clarence H. Mackay, William W. Cook, George G. Ward, Dumont Clarke and Edward C. Platt.

Annual Report of the American District Telegraph Company of New Jersey.

The annual report of the American District Telegraph Company of New Jersey, the annual meeting of which occurred on February 13, is as follows:

	1905	1904	Increase	Decrease
Earnings	$2,534,697.55	$2,389,970.78	$144,726.77	
Expenses	1,842,879.12	1,691,176.32	151,702.80	See note
Profits	691,818.43	698,794.46		$6,976.03
Dividends paid	390,049 00	389,959.00	90.00	
Surplus	$301,769.43	$308,835.46		$7,066.03
Surplus last statement			$420,172.98	
Surplus 1905			301,769.43	
Total sudplus			$721,942.41	$721,942.41
Appropriated for construction—last statement			$364,302.88	
purchase of new property, etc 1905			310,832.34	$675,135.22
Balance				$46,807.19

Note.—The increase of expenses for the year 1905 was due to an amount of reconstruction in some of the old plants acquired by the company.

ASSETS.

Plants, franchises, stocks, patents, etc.	$9,754,784.80
Capital account	675,135.22
Burglar alarm equipment factory	7,846 81
Supplies in stock and in transit	57,661.62
Cash in treasury and due from offices	112,065.48
Accounts receivable	72,981.50
	$10,080,418.43

LIABILITIES.

Capital stock issued	09,754,784.80
Accounts payable, including dividend of January, 1906, $97,515	203,691.22
Profit and loss	721,942.41
	$10,080,418.43

The old board of directors and officers were re-elected.

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

Obituary.

Major J. W. Thomas, president of the Nashville, Chattanooga and St. Louis Railroad Company, died in Nashville, Tenn., on February 12. Major Thomas was an old time telegrapher.

O. E. Madden, well-known in telegraph and electrical circles in New York, died on February 13, at the age of sixty years. Mr. Madden was for a number of years assistant general manager of the American Bell Telephone Company and was quite active in developing telephone interests in the pioneer days of that industry. Afterward he was in the electrical and telegraph supply business in New York City.

Henry Clay Ross, aged fifty-five years, at one time a well-known railroad telegraph operator, but for the past twenty years private secretary to the general superintendents of the Pennsylvania railroad, at Jersey City, died at his home in Roseville, N. J., on February 17. The funeral was attended by many old telegraphic friends.

Edward P. Cauet, of the Western Union Telegraph Company, Chicago, Ill., died on February 15.

Recent Telegraph Patents Granted.

811,994. Telegraph-transmitter. John C. Barclay, New York City, assignor to the Western Union Telegraph Company.

812,142. Fac-simile telegraph. Edward E. Kleinschmidt, New York, N. Y.

811,995. Printing mechanism. John C. Barclay, New York, N. Y. An electric typewriter of essentially Blickensderfer type, except that the usual bails which actuate the type wheel are controlled by power magnets, and the selector finger is likewise controlled by selector magnets.

811,996. Relay. John C. Barclay, New York, N. Y. A contact is swiveled to rock into engagement with two brushes and such swiveling movement is produced by a lever vibrating between two electro-magnets.

812,773. Telegraph instrument. Carl J. Schwarze, Adrian, Mich., assignor to the Schwarze Electric Company, Adrian, Mich. The instrument comprises an electro-magnet, a vibratory armature therefor, spring means controlling the armature and holding it normally retracted, a stop against which the armature is normally held and a closed induction coil on the electro-magnet.

812,557. Method of receiving telegraphic signals. Stephen D. Field, Stockbridge, Mass. The method of signaling consists in initially transmitting high-frequency waves, divided into separate impulses, to a coherer, establishing a circuit including a local battery through the coherer by means of the periodic currents, whereby the currents are transformed into single impulses in the loca lcircuit, subjecting a mechanical vibrator having a gradually changing periodicity to the impulses and finally fixing the periodicity of the vibrator.

812,183. Telegraph key. William O. Coffee, Cleveland, O., assignor to Benjamin F. Bellows, Cleveland, O. A gravity vibrator is adapted to swing by its own tendency and thereby make and break the circuit. A finger key releases the vibrator and an adjacent finger key opens and closes the circuit independently of the vibrator.

Business Notice.

Sears, Roebuck and Company, the great mail-order house of Chicago, write us that they have found it necessary on account of their rapidly increasing business to still further enlarge their enormous forty-acre plant with its fifty acres of floor space. The volume of business done by this enterprising firm is phenomenal. Their sales last year were about forty million dollars, more than the sales of the next five largest mail-order houses combined. Their new big general catalogue, just out, is a wonderful book. Their low prices on the highest quality of all kinds of merchandise are astonishing. Their liberal and newly revised profit-sharing plan by which customers share so largely in their profits, is the most liberal plan ever adopted by any business house. The big catalogue showing all of their new offers and plans is free for the asking. Their big catalogue can be found in every neighborhood, but if you cannot find one they will gladly send you a copy by mail, postpaid, free, if you write and ask for it.

Our endorsement in the largest measure of this great concern is given to our readers and we point with pride to Sears, Roebuck and Company as a firm in which everyone can place the fullest confidence and as an example for business institutions throughout the world.

Municipal Electricians.

The executive committee of the International Association of Municipal Electricians met at New Haven, Conn., on February 22. Among those present were Mr. Jerry Murphy, of Cleveland, O., president of the association; Frank P. Foster, of Corning, N. Y., secretary of the association; T. C. O'Hearn, of Cambridge, Mass., chairman of the executive committee, and A. F. N. Kittridge, of New Haven, Conn. It was decided to hold the next annual convention on August 15, 16 and 17 at New Haven.

A patent, No. 812,733, police signaling apparatus, has been granted to Charles L. Foster and Peter K. Higgins, Los Angeles, Cal. In combination with a normally open signal circuit having signals therein are controlling-circuit patrol boxes through which the controlling circuit passes, a central station and a relay in the controlling circuit having one side connected in series through each patrol box to ground and the other side connected to line leading into the central station. An armature for the relay is connected in the signal circuit and adapted to close the circuit when the relay is energized.

A patent, No. 812,776, automatic fire alarm, has been granted to Alfred Taylor, Victoria, Canada.

Personal Mention.

Mr. Charles R. Hosmer, of Montreal, formerly manager of telegraphs of the Canadian Pacific Railway, accompanied by his wife, sailed from New York for southern Italy on February 17.

Colonel B. W. Wrenn, president of the Auto-Car Company of New York, was for over thirty years a prominent telegrapher and railroad official in the South. At the age of fifteen he entered the service of the Orange and Alexandria Railroad, at Culpepper, Va., as telegraph operator. This was in April, 1862, when the war movements were in full play about him and the situation he held was both eminently important and eminently dangerous. While thus engaged at Culpepper he was the last person to converse over the wires with Alexandria, Va., before its occupation by the United States troops. He vividly recalls the episode. Another incident worthy of mention is that after he had fallen back and become an operator in the Richmond office, he was the one who received the last telegram sent by Gen. Robert E. Lee to Jefferson Davis.

Recent New York Visitors.

Mr. W. S. Burnett, general manager of the Morse Code Signal Company, Milwaukee, Wis.

Frank P. Foster, superintendent of electricity, Corning Glass Works, and secretary of the International Association Municipal Electricians, Corning, N. Y.

Mr. Jerry Murphy, superintendent Police Telegraph, Cleveland, O.

The Railroad.

Officials of the Pennsylvania Railroad are testing a device, invented by C. M. Miller, a telegraph operator, for coaling locomotives while under full speed. It is said that the initial tests have proved successful and fuller tests are soon to be made.

In order to doubly safeguard traffic on the Oregon Railroad and Navigation Company's road, a system of telephones will be established all over the line in connection with the telegraphic communication. E. A. Klippel, superintendent of telegraph, is supervising the installation of the telephones, and the work will be completed as rapidly as possible. Telephone instruments and induction coils will be installed in each telegraph office along the line, and cabooses will be equipped with telephone instruments.

Announcement is made of the appointment of William A. Gardner to be vice president of the Northwestern in charge of all operation of the system. Mr. Gardner has been operating the road since 1890 as general manager. He began his service with the road in 1878 as a telegraph operator.

The Railway Signal Association, H. S. Balliet, secretary and treasurer, with offices at 335 Madison Avenue, New York, holds five meetings a year. The printed proceedings for 1905 which have already been distributed among the members make a valuable addition to the literature bearing on the telegraph and signals on railroads.

The headquarters of Mr. A. B. Taylor, superintendent of telegraph of the New York Central and the West Shore railroads, have been removed from Weehawken, N. J., to the Grand Central Station, New York. In our previous issue we stated that Mr. Taylor had to do with the electrification of the New York Central terminal zone. As a matter of fact his connection with the electrification concerns only the use of the telephone in its adaptation to the work.

Resignations and Appointments.

The following changes have occurred in the service of the Western Union Telegraph Company:

Mr. C. H. Walton, of the Washington, D. C., office has been appointed manager of the company at Albany, Ga.

Mr. T. P. Masters, of the Canadian Pacific Railway Telegraphs, Vancouver, B. C., has been appointed manager of the Victoria, B. C., office.

The following changes have occurred in the service of the Postal Telegraph-Cable Company:

E. F. Carter has been appointed manager at Mojave, Cal., vice C. A. Horsman resigned.

Miss Violet Barwise has been appointed manager at Ontario, Cal., vice Miss Minnie Kunnick, who has been transferred to Riverside as assistant manager.

Mr. H. F. Williams has been succeeded by J. A. Tarr as manager at Kingman, Ariz.

Mr. C. R. Palmer has been appointed manager at Williams, Ariz., vice J. E. DeRosear resigned.

Mr. C. Seely has been appointed assistant manager at Santa Barbara, Cal.

Mr. M. Cline has been anpointed assistant manager at San Diego, Cal.

Miss B. Booton has been appointed manager of the new office in the Alexandria Hotel at Los Angeles, Cal.

Mr. J. Dion has been appointed manager of the San Bernardino, Cal., office, vice Miss Booton transferred.

The German army, which already has three battalions of telegraph operators and one of aeronauts, is to be provided in the near future with a volunteer corps of chauffeurs. At first it was proposed to establish an automobile post station, but the project was abandoned on account of the great cost it would involve. The volunteer automobile corps is to be recruited from among the members of the German Automobile Club, and it is limited to the Prussian provinces and the states whose military contingent is under the direction of the Berlin authorities.

The Care of Storage Battery as Used for Signaling Devices.*

H. W. LEWIS.

*Read before the New York meeting of the Railway Signal Association, January 9.

The able paper presented by Mr. E. L. Adams at the annual meeting, Niagara Falls, October, 1905, brings out the suggestion that it would be well to encourage some discussion on this subject. Acting on this suggestion, I submit the following:

While it is hardly necessary to go into the subject of installing storage battery, I might mention that the instructions furnished by the various battery manufacturers are very complete and if followed to the letter no trouble will result thereafter.

It is very important that the initial charge should be full and complete and for that reason it should be continued until both the specific gravity and voltage cease to rise, then discontinue the charge and immediately adjust the electrolyte to the proper density as recommended by the manufacturers and mark the height of the electrolyte, as this gravity on the cells (a file mark is preferable, as it is permanent) then discharge the battery about half and follow this discharge by a regular eight-hour charge, keeping the electrolyte at the proper height during this charge by the addition of distilled or other known chemically pure water to compensate for the water thrown off by evaporation, and if at the end of the charge the specific gravity has risen to the fixed density and remained there for at least half an hour, it will insure beyond a doubt that the battery is fully charged.

In commission the writer has found the only reliable indication of charge and discharge to be the specific gravity of the electrolyte, while no fixed figure can be laid down, it can readily be ascertained in each individual battery by observing the lowest specific gravity at which the device can be operated at the minimum voltage on closed circuit. This once attained and a reasonable margin allowed, a fixed minimum specific gravity is established. I have found that charging on this basis, and everything going smoothly, we are able to designate regular days for charging.

As the density of the electrolyte varies materially with the temperature, it is therefore necessary to note that a battery having a specific gravity of 1.200 when fully charged at 60 deg. F. would need to be of nearly 1.300 specific gravity at a temperature of 30 deg. F. and nearly 1.190 at a temperature of 100 deg. F., and so on. In general no attention is paid to housing batteries with a view to a uniform temperature, and therefore it is an all important feature that the temperature be watched as well as the specific gravity during charge and discharge and that the electrolyte be maintained at the predetermined height and adjusted at a temperature of 60 deg. F.

The irregular discharge rate to which batteries are subjected in this line of work has a great deal to do with amount of current required to recharge them, the discharge varying from hours to days, weeks and months. I might cite a battery whose discharge covers a period of six and one-half days and as a rule it requires twelve hours at the normal rate to charge it; another whose discharge continues for thirty-nine days requires twenty-nine hours at normal rate, while a battery discharged in two or three days can readily be charged in eight or nine hours at normal rate, the efficiency of such batteries is greatly reduced.

It is very important that batteries in this class of work are not discharged too low, as I have found that in this condition they sulphate more rapidly and there is grave danger of buckling the position plates on charge, the only cure in sight for this bothersome sulphate being incessant charging. This, of course, does the battery no good, as the sulphate falling carries quite a lot of material with it.

It has been suggested that the addition of sodium sulphate to the electrolyte would to some extent prevent this sulphating, and in conclusion I would like our battery friends to tell us, if in adding to this, would it injure the battery and if not, what percentage should be added and in their opinion would it be warranted?

The Destructiveness of the Teredo.

One of the greatest enemies in the world to wood is the insect known as the Teredo navalis. It is really an animated auger, for it will bore through the hardest species of trees unless they are protected from its pointed head. It will practically destroy a telegraph pole in the course of two or three years, unless it is protected by being soaked in creosote or some similar substance. Creosote is a product of distillation of coal-tar. It is an oily fluid, having wonderful antiseptic and preservative properties. The teredo is a native of tropical climates, but as far north as Oregon its destruction is apparent.

Thomas A. Edison's Prediction.

Mr. Thomas A. Edison, who has just rounded out his fifty-ninth year, on February 11, states that the world is now on the threshold of another wonderful era—a golden electrical age. That the discovery of a direct process for harnessing the energy stored in coal will be made and marketed during his lifetime he asserts with confidence. He expects to live long enough "to see the air populous with ships, to hear of many a Nautilus speeding under seas, to witness the arrival and departure of three-day ocean liners, to board trains operated at a fraction of their present cost and far exceeding those of to-day in speed, to perhaps discover the secret of life in radium, and to see the automobile become the dray and carriage of the world."

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NEW YORK, MARCH 1, 1906.

The Book Department of TELEGRAPH AGE, always a prominent and carefully conducted feature of this journal, has, in obedience to continually growing demands made upon it, materially increased its facilities of late. The desire 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. These will be of especial aid to buyers inasmuch as they contain brief descriptive references of each volume listed, frequently with full chapter titles.

The Military Telegraph Pension Bills.

After many years of persistent effort to obtain from Congress some recognition of the claim for pensions for the civil war telegraphers there now seems to be strong probability of success. The Senate has passed a bill to extend the provisions of the pension laws to the war telegraphers, and in the House of Representatives a similar measure has been presented and is now in committee.

No one who has given the matter any thought can deny the justice of the claims of the telegraph veterans for recognition similar to that accorded the soldiers of the rebellion. The telegraph corps constituted a highly important branch of the military service, and the individual sacrifices, hardships and dangers were as real as those of the "man behind the gun."

Now that success seems practically assured, a grand final effort should be made to make it certain. This can be done by appealing to Congressmen. Every one interested in these measures should personally write to his Congressman, pointing out the justice of the claims and urging favorable action when the bill is presented for the final vote. The campaign has been carried on by comparatively few individuals, who have gone into it with heart and soul. When success does finally crown their efforts the many will receive their share of the benefits. Everyone interested should now write and complete the noble work and secure the justice that has so long been withheld from them.

Benjamin Franklin.

Probably no one name linked with the development of electrical science stands out in bolder relief than that of Benjamin Franklin. This remarkable man, who was at once a statesman, philosopher, educator, writer, philanthropist, inventor and electrician, was the connecting link in scientific thought between the first half of the nineteenth century, during which period the world remained in comparative inactivity in respect to scientific achievement. As a scientist he was ahead of the times; the world was not ready for his work. But it is said that ideas are never lost, and this fact was amply verified in Franklin's case. When, toward the middle of the nineteenth century, scientific thought began to reawaken, Franklin's splendid work in science became recognized, and it has ever since stood out prominently in history, and always will.

Franklin's most famous work in science was the kite experiment, which demonstrated the relationship between lightning and electricity. His first important experiments were with the Leyden jar for the charging of which he designed and constructed a static machine. The one fluid theory of electricity was held by him, and it was he who first announced the theory that a pointed lightning rod gradually draws off the electricity in the atmosphere, thus dissipating it and rendering it harmless. In this connection it is interesting to note that a lightning rod erected in Portsmouth, N. H., under Franklin's direction, was still in use a few years ago.

The birth and the development of the telegraph were made possible by Franklin's achievements, and considering the fundamental character of his scientific work the title "Father of Electricity" is a peculiarly fitting one.

Charles M. Schwab, the great steel magnate, has this to say in a letter of advice to young men:

"Go yourself to seek work in life and depend upon your own exertions and merits. No matter what business you enter, the essential feature of success is that you perform your task better than anybody else. This alone will command attention. Everybody is expected to do his duty, but the boy or man who does a little more, is certain

of promotion. I want to state, that of the truly great men I know in industrial or mechanical lines, not one is a college-bred man, but they are men who received an industrial or mechanical education and worked up by perseverance and application.

"Let me advise you all to make an early start in life. The boy with the manual training and common school education, who can start in life at sixteen or seventeen, can leave the boy who goes to college till he is twenty or more, so far behind in the race, that he can never catch up. My parting advice is to start early."

"Telemobiloscope."

An inventor in Dusseldorf, Germany, has designed an instrument which he terms a "telemobiloscope." By its means, it is claimed, a pilot is enabled to detect a ship near at hand in a fog, depending upon the fact that electric waves are reflected when they strike a metallic object. The apparatus consists of a long box or tube, pivoted at one end and open at the other, containing a spark generator near the pivoted end and two lenses for collecting the electric waves. A suitable motor turns the box horizontally on the vertical pivot. As the box, slightly inclined toward the water, is swung around, the electric waves are projected outward, and if they strike an object containing metal they are reflected back, acting upon a receiver similar to that used in wireless telegraphy. This receiver is influenced only by return waves. When a vessel is discovered, the apparatus is turned until the reflection is strongest, when a good estimate of the distance can be made.

The Cable.

The proposal received some time ago by the Government for the purchase of the Alaskan telegraph and cable system by Seattle interests, has been rejected. It now appears that the parties desiring to acquire the system control a telephone system in the Nome peninsula, and wanted the government to turn over its system to them gratuitously with the privilege of purchase at the end of twenty-five years—a proposition evidently without warrant. Further, the system could not be disposed of without authority of Congress, and the chief signal officer of the army recommended that, if in the future it was desired that the government relinquish its control, an upset price be set and bids be called for the purchase of the system.

Guam-Manila cable, reported interrupted February 21, was restored the same day. The interruption was caused by accidental injury at the Manila end.

The Churrillos - Iquique - Valparaiso duplicate cable, which is 1,659 knots in length, has been laid by the cable steamer Faraday, for the Central and South American Telegraph Company. The work was begun in January and finished on February 7. This cable completes a duplicate system of cables owned by this sompany from Selma Cruz, Mexico, to Valparaiso, Chile.

By the death of M. Despecher, who passed away on January 29, at the age of 83 years, submarine telegraphy has lost another of its pioneers. For more than half a century he has been the organizer of all submarine cable enterprises created between the French Government and the English companies before France possessed factories capable of constructing cables and laying them. With Sir John Pender, Mr. Cyrus W. Field, and Sir George Elliot, he organized the first cable between Europe and America. M. Despecher was, in 1861, one of the promoters of the cable between France and Corsica.

In a review of 1905, the Journal Telégraphique enumerates schemes for laying cables, the carrying out of which will be completed in 1906, and succeeding years. Among these is a submarine cable to be laid by the United States Government to the Isthmus of Panama, one by the Mexican Telegraph Co. between Galveston and Coatzacoalcos, and others by the Central and South American Telegraph Co., between Churillos, Iquique and Valparaiso.

The North Eastern Siberia Company is to open up a landline system between the United States, Siberia, China and Europe, and a landline is to be erected across the Sahara to connect Algeria and Southern Nigeria.

If a bill introduced at Washington by Congressman Wanger, of Pennsylvania, becomes law, the Government will embark in the telegraph and cable business in the West Indies. The bill appropriates $1,000,000 to construct a cable from Key West, Fla., to Guantanamo, Cuba, and thence to the canal zone on the Isthmus of Panama. A branch line from Guantanamo to Porto Rico is also provided for.

Cables Remaining Interrupted February 26.

Port Arthur-Chefoo, interrupted March 9, 1904; Cadiz-Teneriffe, interrupted July 20, 1905; St. Jacques-Haiphong, interrupted February 14, 1906; Tangier-Cadiz, interrupted February 18, 1906; Jamaica-Colon, interrupted January 9, 1905; Martinique-Porta Plata, interrupted October 30, 1905; Cayenne-Pinheiro, interrupted August 13, 1902; Curacao-Venezuela interrupted. See Trinidad. (While Trinidad is cut off only way to Venezuela is by mail from Curacao), January 12, 1906; St. Lucia-St. Vincent and St. Vincent-Grenada interrupted, cutting off St. Vincent and Barbados, February 16, 1906; Grenada-Trinidad interrupted, cutting off Trinidad and Demerara, February 22, 1906; Porto Rico-St. Croix and Porto Rico-St. Thomas, interrupted February 24, 1906. These interruptions cut off all West India Islands beyond Porto Rico.

Two Centuries After Franklin.

On the 17th of January occurred the bicentenary of Benjamin Franklin. Not only has posterity assigned to him his rightful position among the greatest and ablest of Americans, but foreigners as well early recognized those qualities of his masterly intellect which placed him among the foremost statesmen and men of science and letters. Undoubtedly his fame rests chiefly upon his public career, his services to his country as a statesman, diplomat, and patriot. An historical figure of international fame, his scientific attainments are overshadowed by his political eminence. And yet, the results of his scientific researches and investigations easily place him in the very front rank of scientific men of the world.

Few, indeed, of us have a proper appreciation of Franklin's work in natural philosophy and electricity. It is true that his classic experiment to prove the identity of lightning and electricity is known the world over; but so general is the ignorance of his other scientific labors, that this great discovery is often regarded merely as a fortuitous and chance occurrence. The utter absurdity of this belief needs no further proof than even slight acquaintance with his painstaking and unremitting study in this as well as other directions; and it is unquestionably true that this experiment was not the origin of a theory, but that it was the culminating test of a line of theoretical reasoning and investigation. Franklin's interest in things scientific was limited in range only by the limits of the knowledge of his time. His splendid versatility and intense interest in all phases of human endeavor led him into branches of knowledge where his remarkably practical mind and sound judgment produced contributions to science of undisputed value. So, his early investigations of chimney drafts were soon followed by the invention of a stove which embodied the principles of the modern hot-air furnace and other devices of like character.

A subject which at this time possessed a peculiar fascination for him was meteorological investigation, and his knowledge and understanding of the general physics of the atmosphere were far in advance of his period. Franklin was probably the first to institute our present methods of tracing and recording storms from point to point, and his investigations of the Gulf Stream, for the first time using thermometric means of verification, were of great value to navigators. No strange occurrence or natural phenomenon was allowed to pass without investigation by the best means at his command. Thus his friend Priestley, in making public the account of his discovery of oxygen, at the same time published a letter from Franklin telling of an inflammable gas found in certain American rivers, known to-day as marsh gas.

Franklin's studies in electricity were, however, carried out further and more thoroughly than his various activities permitted him to do with other branches of knowledge, and upon his electrical investigations rest his great claims to fame as a scientist. His introduction to this branch of science, then beginning actively to engage the attention of men of learning in Europe, was through a Dr. Spence of Boston, who possessed some crude apparatus and was acquainted with the work that had been done abroad. Franklin's interest was at once aroused, and his natural inclination to philosophic study of this character soon induced him to make electrical research one of the prime objects of his life, and a hobby which he did not relinquish until his death. Collinson, the English agent of the Library Company of Philadelphia, and the personal friend of Franklin, supplied him with existing English literature on the subject, and soon sent him Dr. Watson's book, as well as one of the tubes used in the experiments. Franklin eagerly took up the closer study of electrical phenomena, and in 1747, with three others, Kinnersley, Hopkinson and Sing, conducted the famous "Philadelphia experiments," showing the "effect of pointed bodies both in drawing off and throwing off electrical fire." It is almost certain that in these investigations Franklin copied very little from the European investigators; in fact, his scientific surroundings in America almost precluded this possibility. In all probability, he at this time reinvented the static electrical machine for his own use. His splendid fertility of resource and unflagging energy are demonstrated in no better way than in these experiments, hampered by insufficient apparatus and ignorance of what had already been done, but even so, outstripping the work of the best continental scientists.

Franklin evolved the electric fluid theory acceptable to the non-mathematical mind almost to our day. His work with the Leyden jar was classic, and with his experiments begins the forging of the link between this and the voltaic cells.

In 1748 he decided to retire from public life and business, to devote his entire time to electrical study and research. With this purpose in view he sold his newspaper, almanac, and printing house, and the result of this sale, with the fortune he had previously amassed, enabled him to settle down to conduct his experiments unhampered by lack of time, until again called into public activity a few years later. The work on the Leyden jar was continued with marked success, and at this time Franklin was undoubtedly in advance of most foreign electricians. He conceived and used the arrangement of electrical sources in series, a method hitherto unknown. Further, he made the important discovery, and proved it, that the charge of the jar lies near the surface of the glass itself and not in the metal as had been believed.

Unquestionably, his greatest success was in proving that lightning is an electrical phenomenon. As early as 1746, John Freke, a Scotchman, followed by other scientists, formulated this hypothesis, and unsuccessfully attempted its proof. In all probability, Franklin did not know much

about these other theories, and his conception of the identity appears to have come to him early in his investigations, during certain of which he painstakingly observed and noted all the characteristics apparently common to a flash of lightning and an electric spark. In 1749 he sent to Collinson his two famous communications, making known his belief in this identity. Outlined in these letters was a theory of the causes of atmospheric electricity, ingenious though incorrect, which he soon abandoned. He continued his experiments through the summer, and in July of the following year he again sent a long communication to Collinson, giving an account of the experiments in which the invention of the lightning rod is set forth, and outlining a plan for proving that lightning and electricity are of the same character. Collinson recognized the value of the account, and attempted to secure its publication in the Journal of the Royal Society. The Society was not well disposed toward Franklin, and refused to entertain the idea. Cave, the great London publisher, denied the letter space in his Gentleman's Magazine, but consented to print it in book form. This was done, and the publication in 1751 was soon followed by a French translation. The importance of the experiments was recognized in France; and while Franklin, continuing his investigations, was pondering on how to conduct his projected lightning rod test himself, he learned that it had been successfully carried out by French savants. How this had been done he did not know. He was only acquainted with the bare fact of the accomplishment. Nevertheless, he set to work and soon evolved the kite experiment, which made him famous the world over, and which was followed by his election as honorary member to most of the learned societies of Europe, including the Royal Society of England.

It has been held that had Franklin been able to devote his entire time to science, had his studies been pursued in an environment more suited to work of this kind, and had his opportunities for acquiring scientific erudition been more favorable, his fame to-day would rival that of the greatest natural philosophers the world has seen. He was essentially the practical man, of politics, of letters, of science, and this characteristic, coupled with sound common-sense and judgment, led him constantly to attempt the realization of scientific principles for purposes of practical utility. His mental attitude was one of unselfishness, of insensibility to ridicule, and carelessness of praise, as witnessed by the characteristic indifference with which he regarded the early shortsighted attitude of the Royal Society. The recognition of Benjamin Franklin's worth and eminence as a patriot, as a statesman, and as a writer cannot be too great, nor can it be too general, but in our appreciation we must not forget what Franklin's work as thinker and investigator has meant to science, the abstract, and to science as applied to the utilities of ordinary life.—Scientific American.

A Drain on Forest Resources.

With the life of telephone and telegraph poles at its present limit, the 800,000 miles of existing lines in America, requiring 32,000,000 poles, must be renewed approximately four times before trees suitable to take their place can grow. A pole lasts in service about twelve years, on the average, but is made from a tree about sixty years old. In other words, to maintain a continuous supply five times as many trees must be growing in the forest as there are poles in use. The severity of this drain upon forest resources by the telephone and telegraph companies is obvious enough. Just as in the case of railroad ties, the question of pole supply has thrust itself into prominence. To lengthen the life of poles, and in this way to moderate demand and conserve future supplies, have become important matters, affecting the public as well as private interests.

Since 1902 the Forest Service has been making a study of the preservative treatment of poles and of the value of the seasoning in relation to treatment. In this work its first object has been, as in its studies of cross-ties and construction timbers, to make the timber last as long as possible, so as to check the annual demand for renewal, and thus lessen so far as possible the drain upon the forest. Co-operating with telephone and telegraph companies, railroads, lumber companies, and individuals, it has urged forward a series of experiments covering all phases of the problem, from the question of the best season for cutting, through subsequent stages of handling, to the final setting of the pole. Some of the most important results obtained deal with the seasoning process.

Seasoning was studied in the first place to determine the rate at which poles become air dry; that is, lose as much moisture as they will part with through evaporation in the open air. The time of cutting was also carefully considered. Experiment proved that poles cut in winter dry more regularly than those cut at other seasons, and also show a greater loss in moisture at the end of six months' seasoning. The advantages of winter cutting are, therefore, even drying, with a minimum liability to check, and light weight—an obvious advantage for shipment by freight. Spring or summer cutting secures a more rapid loss of moisture at first, owing to the temperature, but only for three or four months. At the end of from six to eight months spring and summer cut poles are found to have dried only three-quarters as much as the winter-cut poles. Spring and summer cutting, however, would result in saving in freight and increased durability if the poles are to be shipped and used within three or four months after cutting.

THE DURABLE SATISFACTIONS OF LIFE.

Part of an Address by Charles William Eliot, President of Harvard University.

"For educated men what are the sources of the solid and durable satisfactions of life? That is what I hope you are all aiming at—the solid, durable satisfactions of life, the satisfactions that are going to last and grow. So far as I have seen, there is one indispensable foundation for the satisfactions of life—health. A young man ought to be a clean, wholesome, vigorous animal. That is the foundation for everything else, and I hope you will all be that, if you are nothing more. We have to build everything in this world of domestic joy and professional success, everything of a useful, honorable career, on bodily wholesomeness and vitality.

"This being a clean, wholesome, vigorous animal involves a good deal. It involves not condescending to the ordinary barbaric vices. One must avoid drunkenness, gluttony, licentiousness and getting into dirt of any kind in order to be a clean, wholesome, vigorous animal. Still, none of you would be content with this achievement as the total outcome of your lives. It is a happy thing to have in youth what are called animal spirits—a very descriptive phrase; but animal spirits do not last even in animals; they belong to the kitten or puppy stage. It is a wholesome thing to enjoy for a time, or for a time each day all through life, sports and active bodily exercise. These are legitimate enjoyments, but if made the main object of life, they tire. They cease to be a source of durable satisfaction. Play must be incidental in a satisfactory life.

"What is the next thing, then, that we want in order to make sure of durable satisfactions in life? We need a strong mental grip, a wholesome capacity for hard work. It is intellectual power and aims that we need. In all the professions—learned, scientific or industrial—large mental enjoyments should come to educated men. The great distinction between the privileged class to which you belong, the class that has opportunity for prolonged education, and the much larger class that has not that opportunity, is that the educated class lives mainly by the exercise of intellectual powers and gets therefore much greater enjoyment out of life than the much larger class that earns a livelihood chiefly by the exercise of bodily powers. You ought to obtain here, therefore, the trained capacity for mental labor, rapid, intense and sustained. That is the great thing to get in college, long before the professional school is entered. Get it now. Get it in the years of college life. It is the main achievement of college life to win this mental force, this capacity for keen observation, just inference and sustained forethought, for everything that we mean by the reasoning power of man. That capacity will be the main source of intellectual joys and of happiness and content through a long and busy life.

"But there is something more, something beyond this acquired power of intellectual labor. As Shakspere puts it—'the purest treasure mortal times afford is spotless reputation.' How is that treasure won? It comes by living with honor. on honor. Most of you have begun already to live honorably, and honored; for the life of honor begins early. Some things the honorable man cannot do, never does. He never wrongs or degrades a woman. He never oppresses or cheats a person weaker or poorer than himself. He never betrays a truth. He is honest, sincere, candid and generous. It is not enough to be honest. An honorable man must be generous; and I do not mean generous with money only. I mean generous in his judgments of men and women, and of the nature and prospects of mankind. Such generosity is a beautiful attribute of the man of honor.

"How does honor come to a man? What is the evidence of the honorable life? What is the tribunal which declares at last—'This was an honorable man'? You look now for this favorable judgment of your elders—of parents and teachers and older students; but these elders will not be you final judges, and you had better get ready now in college to appear before the ultimate tribunal, the tribunal of your contemporaries and the younger generations. It is the judgment of your contemporaries that is most important to you; and you will find that the judgment of your contemporaries is made up alarmingly early; it may be made up this year in a way that sometimes lasts for life and beyond. It is made up in part by persons to whom you have never spoken, by persons who in your view do not know you, and who get only a general impression of you; but always it is contemporaries whose judgment is formidable and unavoidable. Live now in the fear of that tribunal—not an abject fear, because independence is an indispensable quality in the honorable man. There is an admirable phrase in the Declaration of Independence, a document which it was the good fashion of my time for boys to commit to memory. I doubt if that fashion still obtains. Some of our public action looks as if it did not. 'When in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the laws of Nature and of Nature's God entitles them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.' That phrase—a decent respect—is a very happy one. Cherish 'a decent respect for the opinions of mankind,' but never let that interfere with your personal declaration of independence. I have said begin now to prepare for the judgment of the ultimate human tribunal. Look forward to the impo crises of your life. They are nearer than you are apt to imagine. It is a very safe protective

rule to live to-day as if you were going to marry a pure woman within a month. That rule you will find a safeguard for worthy living. It is a good rule to endeavor hour by hour and week after week to learn to work hard. It is not well to take four minutes to do what you can accomplish in three. It is not well to take four years to do what you can perfectly accomplish in three. It is well to learn to work intensely. You will hear a good deal of advice about letting your soul grow and breathing in without effort the atmosphere of a learned society, or place of learning. Well, you cannot help breathing and you cannot help growing; those processes will take care of themselves. The question for you from day to day is how to learn to work to advantage and college is the place and now is the time to win mental power. And, lastly, live today and every day like a man of honor.

What Friendship Means.

Ella Wheeler Wilcox says of friendship:

"Friendship is a word often and lightly used, and few of us realize just what is meant by the term, 'a loyal friend.' To stand by a friend 'through good and ill' is supposed to be one of the requisite qualities of loyal friendship. Yet the man who stands by his friend to the extent of justifying his evil deeds is not his friend, but his worst enemy. You may attend your friend through his trial before judge and jury, and use all the influence you possess to save him from punishment of the law, believing that he will not repeat his error, but if you justify his conduct and uphold him in a defiance of law and order, that is not friendship.

"Only when you inspire your friend to live up to the best within himself are you the real friend.

"'I would stand by you under all conditions' is not so noble a sentiment as to say: 'I would always love you under all conditions, but I could not stand by you when I knew you were doing what was unworthy of you.'

"Friendship takes us to the brink with a reckless friend, but it is only weakness and folly which take us over the brink. We serve no purpose, divine or human, by such an act. It is better that the friend repents and wants to try again, than that we should go down in the dark waters with him.

"Friendship demands that we should treat our friend's friend with courtesy and kindness, but it does not make it always possible to enjoy his society. It does not even save us from the possibility of being inexpressibly bored by the very association which may be delightful to our friend. On the other hand, the uncongenial acquaintance of our friend may prove a charming companion to us in many ways. Because our friend does not enjoy him is no cause why we should drop him from our list. Tyranny demands such proofs of obedience: friendship never.

"The man who has been guilty of absolute cruelty, disloyalty or meanness toward our friend can never sit at our board or share our hospitality, no matter how charming be his demeanor to us, if we would be worthy the name of absolute friend. We are not called upon to cater to our friend's dislikes, but we are called upon to feel his injuries.

"Friendship does not mean that we must see no flaws or mention no faults. It does not mean that we should praise whatever our friend may do, good, bad or indifferent. It calls for careful and kind criticism and analysis.

"Yet if his standards differ from your own and he holds to them and does not abandon them for yours, it is no evidence that he is not appreciative of your interest. For each soul must follow its own light, and not that lent by another, however unselfish and devoted that other may be.

"Friendship does not necessitate the same point of view on all subjects. It necessitates the same sense of honor, the same adherence to principle, but individual opinions, views and ideas add to the interests of friendship.

"Devoid of the sense element of love, jealousy is impossible, and if the dwarf twin of jealousy, envy, approaches, it must shrink and die under the clear light of a friend's gaze.

"Friendship does not mean bearing another's burden; it means giving a friend the courage and strength to bear his own cheerfully. It means helping him over the rough places, but it does not mean walking and carrying him."

Growth of Telephony.

Speaking about long distance telephony, C. J. H. Woodbury, an official of the American Telephone and Telegraph Company, said recently:

"The toll line service began with the line built from Boston to Lowell in 1879, and this revealed both the functional possibilities of the telephone and the great many technical difficulties which have been overcome, and in the space of twenty-five years the length of long distance telephone lines has increased from twenty-seven to 275,000 miles. But these lines are not to be considered as comprising all of the lines outside of any municipality, as they can be attached to lines about 4,000,000 miles in length and radiating at these points, reach to the desired subscriber.

"When a person uses a long distance telephone, a large amount of property is at their exclusive service—for instance, in speaking from Boston to Omaha, as one business firm does every morning, the value of the fraction of line and apparatus at their sole disposal is at the present price of copper over $283,000, while it requires the service of nine operators at the switchboards at various points along the line."

Mr. Hesketh Reports on the Telegraph.

(Concluded from Page 79.)

[In our previous issue we printed a portion of the report of Mr. John Hesketh, electrical engineer to the Queensland postal telegraph service dealing with the telegraphs in the United States. In this issue we give his observations of the telegraphs in Europe. His statement will no doubt prove interesting to our readers.]

In regard to the telegraph in other countries, Mr. Hesketh says that in Stockholm, Sweden, the telegraph switchboard system of distributing is the only point in which this system differs notably from our own.

He says that "there are many points of technical interest in the German telegraph system, but they are not such as are to be recommended for adoption in Australia, excepting only the switchboard system, which is now adopted here in the larger offices, and possibly the system of A.B.C. printer for small receiving offices."

"In Vienna, Austria, again, the only point of special interest was the telegraph switchboard.

"This system of handling traffic, particularly suburban traffic, was first introduced in Brussels, where I saw it in operation. Here practically the whole of the traffic of the State is handled by means of the switching system. By this system the lines which are not constantly busy are not connected to a separate instrument where an operator would be required for one, two or three instruments, as the case might be, but are connected to a switchboard, and, by a special operator, are connected either to each other for business which can be transmitted direct from office to office, or to idle instruments for business which is to be delivered from or retransmitted by the switching office.

"By this means, economy of operating and greater speed of transmission are obtained.

"The system is one which, in my opinion, would be of advantage in Sydney and Melbourne, but possibly the conditions in Brisbane or Adelaide are not yet such as to justify its adoption there."

Of the British system, Mr. Hesketh says:

"By far the foremost telegraphic administration in the world is that of the General Post Office, Great Britain. Here a special staff of highly-trained officers is maintained. The special duty of these officers is to inquire into new systems, and to develop new methods. By the courtesy of the engineer-in-chief, Mr. John Gavey, the whole of the experience of this huge department was placed at my disposal and passed in review.

"Summarized, the points of chief interest are the following:

"Ordinary Morse working presents no special features, except in so far as it is applied to local lines, when specially designed sounders are employed. These are of a type like the old acoustic dial, single needle, and possess advantages for local lines, where they can be employed in a manner similar to that in which box sounders are used in America, and in the sub room, Melbourne.

"For such local lines the switchboard system of working is now standard in all the larger offices.

"Duplexes are used freely, but possess no special features. It is worthy, however, of note, that the double-current key, which the operators in Australia say seriously affects their operating, and causes premature breakdown, is used exclusively in the British service on double-current circuits, and without any complaint.

"Quadruplexes.—In England the quads work splendidly. Nowhere else have I seen such successful operating of the No. 2, or B side. The reason for this success is, in my opinion, to be found in the electrical constants of the circuits (they are much shorter than ours, and of heavier copper, usually), the great care given to the technical arrangements of the quads, the elimination of defective apparatus (generally found in the pole-changers), and the care exercised in balancing.

"By a special arrangement of the local on the No. 2 side, the uprighting sounder has been dispensed with at no loss in efficiency. This arrangement could, with advantage, be tried on some of our troublesome quads, and the effect seen. If the nethod as used in England is not itself useful with us, some modification of it can doubtless be applied with advantage.

"High-Speed Systems, etc.—In England, every promising new system is given a complete trial under the supervision of the inventor, if he desires. The systems, therefore, which have survived in Great Britain are those which have most worth. It is noteworthy that of the trials so far completed, the apparatus which has survived and demonstrated its usefulness to the fullest extent is the Wheatstone system.

"Now, although the Wheatstone system has survived, and is used practically to the exclusion of every other automatic system, it is remarkable that it is not now worked up to the highest possible speeds, nor is any effort made to increase speeds for normal working.

"The reason for this was given to me by Mr. Gavey. It appears that a special departmental committee was appointed to make recommendations as to certain traffic and technical matters in connection with the telegraph department. This committee advised that it was not advisable to work Wheatstone over 200 words a minute, for the reason that when this speed was exceeded the delay to business was simply transferred from the transmitting to the receiving end.

"It was a practical impossibility to so staff a Wheatstone line that the slip could be written up with no delay if the line were worked at maximum speeds. In other words, the experience of this great department is to the effect that to try after excessive speeds is a practical error, and that it is better to adopt such reasonable speeds as 200 words a minute rather than try after 600,

or more, by systems which depend upon the transcription of slip. The same argument does not apply to direct printing systems. This decision is the more remarkable, seeing that speeds as high as 600 words a minute have been attained by means of the Wheatstone system, and are now practically abandoned, although within easy reach on open aerial lines."

Charles Shirley Becomes Superintendent.

Mr. Charles Shirley, who has just been advanced from the managership of the operating room to be superintendent of the main office, as well as the city branch offices, has earned his promotion by hard painstaking work in the interests of the company he has served so long and faithfully.

Mr. Shirley was born in London, England, on November 4, 1858. At fourteen years of age he

CHARLES SHIRLEY.
The New Superintendent of the Postal Telegraph-Cable Company, New York.

became an operator on the Great Western Railway in England, holding several positions on that system until 1879, when he came to the United States. In May, 1880, he secured employment as an operator in the service of the American Union Telegraph Company in New York. When the American Union Telegraph Company wound up its affairs, he entered the service of the Continental Company, where he remained about eighteen months, then he resigned to accept a more lucrative position with the American Rapid Telegraph Company. Five years later the Bankers and Merchants Telegraph Company, having formed and secured the American Rapid plant as part of its system, Mr. Shirley was appointed night chief operator in the New York main office of that company. This position he held until 1887, when he was made night manager of the Postal Telegraph-Cable Company's main office, at 187 Broadway. In March, 1889, he was appointed acting manager of the same office, and in June of the same year he received the appointment of assistant manager, and in June, 1894, he was made manager.

In the various positions which he has held since he began his telegraphic career, he has given the utmost satisfaction.

Charles E. Bagley Promoted to Be Assistant Superintendent.

Mr. Charles E. Bagley, who has just been appointed assistant superintendent of the Postal Telegraph-Cable Company, with headquarters at New York, has for the past three years been manager of the Philadelphia office of the same company. Mr. Bagley is a native of Boston, Mass., where he was born on January 7, 1866. His entry into the telegraph service was in 1881, in his native city, where his abilities were quickly recognized, and he rapidly passed through the several grades of positions, including the managership of all the Boston offices, until he finally reached the position of assistant superintendent, to which position he was appointed in 1898. This

CHARLES E. BAGLEY.
The Newly Appointed Assistant Superintendent of the Postal Telegraph-Cable Company, New York.

place he resigned a few years since to engage in outside business. This venture proving unsatisfactory to him, Mr. Bagley returned to the service, entering the employ of the company at Philadelphia, Pa., where he was soon promoted to be manager of the company's affairs in that city. His present promotion is further proof of the excellent ability and sterling worth of the man.

LETTERS FROM OUR CORRESPONDENTS.

[Advertising will be accepted to appear in this department at the rate of five cents a word, estimating nine words to the line, announcements to be enclosed with a border and printed under the name of the place of the advertiser. The special local value attached to advertising of this character will be apparent. Our agents are authorized to solicit advertisements for these columns, and further information on this subject may be obtained on application.

The current information of any office will, if carefully chronicled, furnish a welcome digest of news that will be read with pleasure and satisfaction by thousands, and this limit should constitute the legitimate contents of all letters. And we wish that our correspondents would avoid the too frequent habit, at all times a bad one, of abbreviating words in writing. This is a peculiarity among telegraphers, we know, but what may be plain to the writer, and for local interpretation, is usually a mystery to the editor, and is apt to lead to error in the printed statement.]

ST. LOUIS, WESTERN UNION.

Mr. Harry Nagel was the fortunate winner of a diamond stud recently raffled for.

Mr. Geo. W. Flowers, who was stricken with paralysis now appears to be in a fair way to recovery. He is expected back to the key within a few weeks.

Miss Stacia Owens has left the main office to accept a position at the Union Station branch.

Mr. T. W. Simpson, formerly operator at the main office here, has been appointed manager at Muskogee, I T., succeeding Thos. McLaughlin.

Mr. Geo. Miller, who worked the cotton wire here, was recently appointed manager of the time service department, vice Robt. Tessmer .

PEORIA, ILL., WESTERN UNION.

The following is the personnel of this office at the present time: William Howard, manager; L. O'Loughlin, chief clerk; clerks—Miss Victoria Wilde, Casper Salm, R. W. Trotter, A. G. Miller, while F. L. Michael is in charge nights.

The operating department is presided over by E. J. Mahoney, chief operator; T. J. McGrath and J. R. Taliaferrro, on the Chicago quad, while F. E. Lowe, B. E. Brill, Homer Barlow and Miss Sarah Hughes attend to the other wires. Mrs. P. S. Lytle furnishes us ith the weaher reports from the new United States Weather reports, and assists at the main office while operators are called from labor to refreshment.

Branch offices are taken care of by F. C. Sheahan, at Main Street; W. L. Miller at the Stock Yards, and Miss M. R. Mahoney at the Union Depot.

NEW YORK.

POSTAL TELEGRAPH-CABLE COMPANY.

EXECUTIVE OFFICES.

Mr. G. W. Blanchard, superintendent of the New York City offices and the marine service, has resigned to engage in the real estate business.

Mr. Charles Shirley, manager of the New York main office, has been promoted to be superintendent of the city offices, including the main office, vice G. W. Blanchard.

Mr. F. F. Norton, assistant manager, has been promoted to be manager of the main office, vice Charles Shirley, advanced to the superintendency.

The marine service, which has previously been under the jurisdiction of Mr. G. W. Blanchard, has been transferred to the district presided over by George H. Usher, superintendent.

Mr. Charles E. Bagley, manager of the Philadelphia office, has been advanced to the position of assistant superintendent of the New York main and city offices, which is a new position.

Mr. J. A. McNichol, night manager, has been appointed manager of the Philadelphia, Pa., office of the company, vice Charles E. Bagley, promoted.

Mr. H. N. Bauer, formerly connected with the district electrician's office, at New York, is now with the Southwestern Telephone and Telegraph Company as wire chief at Dallas, Tex.

Mr. Francis W. Jones, electrical engineer of the company, owing to a severe case of bronchitis, has found it necessary to take a southern trip.

Mr. Charles C. Adams, fourth vice-president of the company, accompanied by his wife, left for California on February 23 on business connected with the service.

Mr. Thomas E. Fleming, special agent of the company, is again at his desk after an absence of some weeks on a business trip connected with the service.

IN THE OPERATING DEPARTMENT.

W. Wolff, recently of the Cotton Exchange office, has been added to the night force.

W. T. Budds and H. Dobbs have been added to the all-night force.

T. P. Brooks is located at the 954 Broadway office for an indefinite period during the heavy file of business there.

P. J. Glynn is located at the 1947 Broadway office for a short period.

T. P. Smith, assistant quadruplex chief, has gone to Baltimore to study the Rowland telegraph system.

J. L. Barnum and L. G. Thornton have been added to the night force.

Mr. Charles Shirley, manager of this office, was recently heard to pay a glowing tribute to the worth of the late William B. Clum, who died at the age of seventy-nine, on January 29. He said: "I must admit that Mr. Clum was as good an operator the last day he worked in this office as he was twenty-five years ago, and that means that he could care for our most difficult wires on which there were innumerable small offices cut in."

F. F. Norton Becomes Manager of the New York Office.

Mr. F. F. Norton, who has just been promoted to the position of manager of the main office to succeed Mr. Charles Shirley, is a native of England, having been born at Barton, Oxfordshire, on July 23, 1858. His promotion from the assistant managership to direct charge of the largest office

in the Postal service has been earned by his fairness in the treatment of all interests under his charge. He is genial, courteous and exceedingly companionable, yet very firm in business transactions, which are naturally the essentials that go to make up a competent manager. Mr. Norton learned telegraphy at St. Thomas, Ontario, in 1873, and entered the service of the Montreal Telegraph Company, remaining with that company till 1880 as chief operator and manager, then resigning to go with the Dominion Telegraph Company at London, Ontario, as operator. In 1881 he came to New York as operator for the Western Union Telegraph Company. In January, 1882, he cast his fortunes with the Baltimore and Ohio Telegraph Company as operator and manager of their first main office at 63 Broadway, and afterward traffic chief of the main office at 415 Broadway. His prompt and systematic manner of handling his men and business, won him much

F. F. NORTON.
The New Manager, Main Office, Postal Telegraph-Cable Company, New York.

favor, both with the company and those in his charge. Upon the absorption of the Baltimore and Ohio by the Western Union Telegraph Company, he retired from the ranks, but in 1888 he again entered the service as operator, and in May, 1889, was appointed as all-night chief for the Postal Telegraph Company, which post he filled until 1891-92, when he was made city chief. He was further advanced until he was made assistant manager of the office, which position he now relinquishes to go higher.

WESTERN UNION TELEGRAPH COMPANY

EXECUTIVE OFFICES.

Among the recent visitors to the executive offices were Manager W. A. Rudd, of the Boston office; Mr. Charles F. Annett, manager at New Haven, Conn.; Mr. C. R. Tilghman, of Cincinnati, O., an attaché of the electrical engineer's department.

Mr. Charles M. Holmes, the executive messenger, on February 10, assisted by his numerous friends, celebrated his sixty-eighth birthday.

IN THE OPERATING DEPARTMENT.

Mr. W. H. Mayer, of this department, is quite an adept in photography. His work is of a very high class, and of late he has been employed to take pictures of the various properties of the Western Union Telegraph Company located in this city and also the various marine stations owned and operated by the company.

Miss Anna M. Keating and Mr. M. F. O'Neill, both of this office, were married in St. Peter's Church, in Barclay street, Sunday evening, February 18. A host of friends were present at the services, and the floral decorations, offerings of friends of the bride, were much admired. Mr. and Mrs. O'Neill were the recipients of many valuable presents. After the ceremony the couple started for Lakewood, N. J.

The nominations for the various offices in the New York Telegraphers' Aid Society for the ensuing year will close on March 8. The usual hustling of the friends of the candidates will, therefore, soon be in evidence.

The resignations include Messrs. S. Holland, F. P. Sheridan, W. Klitz and D. Grosso.

Mr. J. A. Kenna, an old time telegrapher of this office, was recently severely injured by a horse falling on him at his home, in Concord, N. H.

Mr. Edward F. Welsh, assistant general wire chief of the company, who is still very much alive and in evidence, should not be confounded with Edward F. Welsh, a New York telegraph operator, and at various times an employee in this office, who recently died.

Mr. M. J. Kenna has returned to the city from New Orleans, where he has been located during the winter.

Charles S. H. Small, a native of England, aged fifty-five years, night traffic chief of the southern division, died of oedema of the lungs, on February 20, at his home in Passaic, N. J. Mr. Small was at one time assistant superintendent of the Gold and Stock Telegraph Company and held other important positions in the service. He was the first secretary of the Gold and Stock Life Insurance Association, and held certificate of membership number three.

Three Chicago circuits have been equipped with the Barclay printing system, and a fourth circuit to the Lake City will soon be installed.

OTHER NEW YORK ITEMS.

Assessments No. 445 and 446 have been levied by the Telegraphers' Mutual Benefit Association to meet the claims arising from the deaths of Charles S. Champlain at New York, N. Y.; Jeremiah D. Flynn at Pittsburg, Pa.; Edwin Reynolds at Brooklyn, N. Y.; Alfred J. Bailey at Brooklyn, N. Y.; Elijah L. Bugbee at Washington, D. C.; Ransom A. Davis at Cleveland, O.;

George S. Hoyt at Shannock, R. I.; Hiram C. Shorey at Newawkum, Wash.; Howard D. Huntsman at Langhorne, Pa.; Daniel A. Toland at Philadelphia.

The Commercial Telegraphers Union, Local 16, will hold their annual smoker and tournament at the Manhattan Lyceum, 66 East Fourth street, New York City, on April 20 next. The proceeds of this entertainment, for which the best professional talent has been secured, will be devoted to the sick benefit fund.

The sale of tickets has already exceeded the most sanguine expectations, and if Local 16 does not have a handsome surplus in its sick benefit fund at the conclusion of the forthcoming smoker it will not be the fault of its enthusiastic committee. C. P. McInerney, the local secretary, at Room 527, American Tract Building, 150 Nassau street, will be pleased to furnish tickets or any other information desired.

Mr. H. E. West, for twenty years identified with the Western Union Telegraph Company, is now cable engineer of the government cable steamer Cyrus W. Field, located in New York harbor.

The printed proceedings of the seventeenth annual meeting of the Magnetic Club of New York, which occurred on January 11, have been distributed among the members. The reports of the officers show the club to be in a most prosperous condition; $117.14 being the amount on hand after all expenses had been paid.

Mr. Robert Tomes, for many years identified with the central cable office of the Western Union Telegraph Company at 20 Broad street, is now the eastern representative of a number of western papers, and is reported to be one of New York's leading newspaper correspondents.

The New Postal Office at Birmingham, Ala.

The new offices and operating room of the Postal Telegraph-Cable Company at 2004 and 2006 First avenue, Birmingham, Ala., are said to be the most complete in the south. More operators are employed here than in any other southern city.

The operating room, which is on the second floor, has seating space for one hundred and eight operators, and about seventy are employed in the office all the time. Over one hundred people are on the payroll. The room is lighted and ventilated by two skylights and fourteen windows.

The operating tables are of the latest pattern and are designed especially for typewriters only. Pen and ink have been entirely discarded, and all messages are taken on the typewriter.

Manager T. D. Jackson states that the Postal company's facilities in Birmingham are much larger than they are in any other city of the size of Birmingham in the country, and, in fact, that they are greater than the facilities of many cities that are much larger than Birmingham.

Postal Telegraph-Cable Co.'s New Office at Fitchburg, Mass.

The Postal Telegraph-Cable Company has recently moved its office at Fitchburg, Mass., from 128 Main street to the Park Building, 119 Main street. The new office is equipped with all the modern conveniences. It is as fine an office as the company has anywhere in New England, being large, well lighted and located in the business section of the city. The cables entering the office, and the new switchboard were installed by J. P. O'Donahue, district electrician, and J. F. Patterson, of Boston. The inside wiring was done by W. K. Pulsifer, station electrician, who has his headquarters at Fitchburg. Mr. Pulsifer has also devised many little conveniences for the operating room, one of them being an arrangement for the district and watchman's night signal system; an attachment showing a light on each register when a call comes in.

NEW POSTAL OFFICE, FITCHBURG, MASS.

The inside equipment of the office consists of a quartered oak quartette typewriter operating table, furnished with resonators of the latest design. The Carmody District Messenger and Night Watchman Signal Service is operated in connection with the Postal Telegraph-Cable Company, of both of which companies Mr. J. C. Carmody is manager.

A storage battery plant was installed some time ago to operate the district circuits.

The office force consists of J. C. Carmody, manager; Miss B. M. Atkins, assistant manager; Miss Margaret A. Hogan, stenographer and bookkeeper; Thomas B. Walsh, operator; John F. Enwright, night signal and telegraph operator, W. K. Pulsifer, station electrician.

Retirement of J. W. Fisher, of Nashville.

Mr. Joseph W. Fisher, the veteran telegrapher of Nashville, Tenn., on February 12 retired from active connection with the Western Union Telegraph Company, closing an eventful career which practically comprehends the entire history of the Morse telegraph.

Entering the telegraph business June 30, 1850, Mr. Fisher retired February 12, 1906, after covering a period of active service of little less than fifty-six years, and with the exception of four years during the Civil War, his connection has been with the Nashville office.

Mr. Fisher was born in Nashville, September 26, 1833, within two squares of the present Western Union office. In his connection with the telegraph business he was in intimate association with Dr. Norvin Green, John Van Horn, George W. Trabue, Joseph B. Tree, James Compton and other prominent Southerners who were conspicuous in the development of the Morse system of telegraph.

Prof. Samuel F. B. Morse in demonstrating the accomplishments and advancement of the telegraph at the great Paris Exhibition in 1855, made request of Mr. Fisher, who was noted as a rapid operator, to make speed records for the exhibit. Mr. Fisher, under a five-minute speed test, sent two hundred and fifty words, fifty-five words being transmitted in the first minute. The competition in this contest was keen, but Mr. Fisher's speed far exceeded his competitors, and he was recorded as the fastest operator in the world. This record was remarkable insomuch as with all the improvement in apparatus and construction of telegraph lines which has greatly increased the possible speed of a circuit, this record was not equaled until about five years ago.

General Mention.

On March 1 the Northern Telegraph Company of Maine will discontinue its business relations with the Western Union Telegraph Company and will interchange business with the Postal Telegraph-Cable Company instead. The Northern Telegraph Company's lines run along the road of the Bangor and Aroostook and Northern Maine seaport railroads. Mr. F. W. Cram, president of the railroad company, says that the relations of the company with the Western Union have always been harmonious, but that the contract with that company expires March 1, and it has been decided to make a change. The Western Union Telegraph Company will establish independent offices at the points reached by the railroad.

Mr. W. H. Stansell, manager of the Postal Telegraph-Cable Company at Charlottesville, Va., in a recent letter to this paper, says:

"I see no reason why an up-to-date telegraph operator or manager employed in any telegraph company should be without TELEGRAPH AGE. I have not been a reader of TELEGRAPH AGE very many years, still I find it a splendid collateral in my course in telegraph engineering. I know of no other paper that keeps me so well informed as to what his fellow laborers are doing and what advances are being made in the telegraph field as your paper."

James S. Stone declares that by wireless telegraphy one can now send forty words a minute, or as many words as wire telegraphy, and that, contrary to Edison and Marconi, its greatest service will be on land rather than on sea, improvements having been made since their judgments were given that will upset all their calculations.

Rev. Joseph Murgas, of Wilkes-Barre, Pa., who has invented a system of aerial wireless telegraphy, announces that experiments in underground wireless telegraphy have reached a stage when he can promise soon to send a wireless underground message to Europe.

A citizen of South Carolina has brought suit against one of the telegraph companies, claiming $1,500 damages for its failure to deliver a telegram in time to permit him to attend the funeral of his mother-in-law. The bill of complaint does not state whether the delay in the delivery of the message caused him sorrow or delight.

Mr. Andrew Carnegie has pensioned Mr. J. H. Larcomb, a well-known old time Washington, D. C., telegrapher, who for some years past has been an attache of the government pension bureau. Mr. Larcomb was at one time Mr. Carnegie's manager, and the good relations then established still prevail.

A. B. Leach and Company of New York have purchased $500,000 Western Union collateral trust 5% bonds, maturing January 1, 1938. They are offering them to investors at a price to net the investor approximately 4½%.

The Canadian Pacific Railroad Telegraphs contemplate a further improvement and extension of their telegraph lines in the immediate future in British Columbia.

Deterioration in Storage Batteries.

Literature of no definite nature exists upon the deterioration of the secondary cell and its cause, says the Western Electrician. Certain impurities are injurious to the action of the lead-sulphuric acid cell, as is fully realized, but knowledge of the exact amount of each impurity admissible is indefinite and practically a matter of conjecture. A great deal of interest, therefore, attaches to a paper which was read recently by G. D. Aspinall Parr before the Leeds Local Section of the British Institution of Electrican Engineers. The paper is based upon a series of tests recently commenced by Mr. Parr, which throws considerable light upon this hitherto little-known subject.

Some Valuable Telegraph Books.

All of the books described in the following list embody a choice number from which selections may advantageously be made, and furnishes an excellent catalogue for the consideration of telegraphers. Any book named will be sent upon receipt of price to any address, carrying charges prepaid. Address J. B. Taltavall, TELEGRAPH AGE, 253 Broadway, New York.

POCKET EDITION OF DIAGRAMS.

"Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students" is acknowledged on all sides to be the standard work of the telegraph. Speaking strictly within bounds, it is not too much to say that this volume presents the finest study of the complex subject of the telegraph ever attempted. There is no other book like it or even approaching it, in thoroughness, comprehensiveness, or in original detail of statement. The author, Willis H. Jones, is a practical telegrapher himself—an engineer in his profession of recognized ability, who knows exactly what other telegraphers want to know, and has the faculty of imparting that knowledge in a manner at once so clear, so simple, so bright, so entertaining, so free from needless technicalities, that his readers, even the least informed among them, readily understand his meaning. The helpful qualities of the work will be clearly manifest alike to the beginner, to the student, to the operator and to all telegraphers whether in the commercial or in the railroad service.

"Pocket Diagrams" does not deal in theory; it is packed full from cover to cover of the common sense of telegraphy, the side against which the ordinary every day operator runs up against, and respecting which he desires information of the kind that will aid, not mystify, him. The book contains 334 pages, and has 160 splendid diagrams. It has the unqualified endorsement of telegraphers everywhere.

Always a desirable purchase to the student in his profession, it is specially recommended at this time as a peculiarly appropriate gift for the holiday time among telegraph people.

The price of Pocket Edition of Diagrams, etc., is $1.50.

PHILLIPS CODE.

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 Mr. A. P. Velie, an expert press and code operator, for many years identified with The Associated Press, New York, a few revisions made and a number of contractions added, until now this "stanch friend of the telegrapher" is strictly up-to-date in every particular. It has been declared that an essential qualification of a "first-class operator" was a thorough understanding of Phillips Code.

Many expert code operators have examined the revised edition of this code, and all unite in pronouncing it perfect. Mr. George W. Conkling, who has won the championship for sending code in many tournaments, says:

"I have examined thoroughly the additions contained in the latest edition of the Phillips Code and most heartily approve of them. Every operator who is familiar with the code should find no difficulty in mastering the new contractions, as they 'fit in' smoothly and I think the ground has been entirely covered."

The price of the book is $1 per copy.

"Telegraphers of To-day," illustrating the personnel of the telegraphic profession with more than 900 biographical and historical sketches of leading members of the craft, is a unique and valuable work; it has become standard, being the only work of the kind extant. It contains 354 double column pages, 7 by 11 inches in size, has gilt edges and is bound in imitation Morocco—altogether a handsome volume.

Of this fine publication, becoming more and more valuable as time passes, we have but a few copies left. The original price was $5. In order to readily dispose of these remaining volumes, and place them where they rightfully belong, in the hands of every telegrapher who failed to secure a copy at the higher original price, we have cut the figure to $1 a volume. On receipt of this amount the book will be sent to any address, express charges to be paid by the purchaser. At this low rate, a sum below the cost of binding the book, no telegrapher who desires to own a copy should fail to obtain one at this time, for this "bargain" price will probably never be repeated.

"The Quadruplex," by William Maver, Jr., and M. M. Davis, still holds its own as a work of authority in its treatment of its subject. A clear anaylsis of that system of telegraphy is afforded and telegraphers have constant need of the book. There are 128 pages in the volume and 63 illustrations; price, $1.50.

The life of Prof. S. F. B. Morse, the standard work, authorized by the Morse family, and compiled from original papers and other authentic data in their sole possession. It is a clearly written biography, charmingly told by a trained newspaper man, a close personal friend, and presents the life of this great inventor of the telegraph in a broader, more intense, human and truthful attitude than ever before attempted or even possible; 775 pages, illustrated; sheepskin binding. The original price was $6, which we have reduced to $3, on receipt of which the book will be sent, express charges prepaid.

"The Telegraph in America," by the late James D. Reid, the "father of the telegraph," furnishes an authentic and complete history of the telegraph, tracing out its early start, its development, the organization of the various telegraph and cable companies, etc. The book is bound in full Russia, has 846 pages and is abundantly illustrated; a magnificent gift to any telegrapher. There are now but a few copies left of this great work and when these are gone the work will be out of print. The original price was $7, but as the covers are a little shopworn the price has been reduced to $5.

"Sketches Old and New," by Walter P. Phillips, is a handsomely bound volume of 164 pages of interesting and charmingly told telegraph stories; one of the very best works of the kind ever published and which will appeal strongly to every telegrapher; price, $1.

"Lightning Flashes and Electric Dashes," a book made up of bright, ably written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 160 large double-column pages; profusely illustrated; price, $1.50.

Old Timers' Souvenir—Miniature Legless Key. This is a beautiful emblem for operators; an attractive charm for the watch chain; a perfect duplicate in every detail of the celebrated miniature steel lever telegraph key that attracted so much attention and which was distributed as a souvenir at the banquet of the Old Time Telegraphers' and Historical Association at the Waldorf-Astoria, New York, August 31, 1905. It has a French lacquered body and nickel-plated lever. Price, by registered mail, prepaid, $2.50.

"The Practical Management of Dynamos and Motors," by F. B. Crocker and S. S. Wheeler, as indicated by its title, affords a clear understanding of the use, care and operation of these important adjuncts of the well equipped modern telegraph office. There is a constant demand for this book, for telegraphers find it an invaluable addition to their working library. There are 206 pages, and 99 illustrations; price, $1.

"Electrical Instruments and Testing" is the title of a new volume by that industrious and excellent writer on such subjects, Norman H. Schneider. This book treats of the use of the voltmeter, ammeter, galvanometer, potentiometer, ohmeter and the Wheatstone bridge. The explanations are practical, given with numerous worked out examples, fully illustrated with diagrams and drawings. The book is intended for practical, everyday use, and also as an introduction to the larger works on electrical testing. The apparatus described is modern and such as is generally employed. The volume is well printed on plate paper, contains 190 pages, including a fine index, and there are eleven chapters and 105 illustrations. The price is $1; bound in cloth.

Important Subjects Treated in Back Numbers.

TELEGRAPH AGE has published the best articles on telegraphic subjects that have ever appeared in print. Herewith 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.

Adjustment of Relays and Sounders.....Oct. 1, 1902
Alternating Current Transformer for Quadruplex, W. H. Jones. Mch. 1-16, 1904
American Cable Across the Pacific.....July 16, 1903
Alaskan Telegraphs.....Jan. 1-16, Feb. 1, 1905
Atmosphere and Earth Electrical Conditions, E. C. Walker, Dec. 16, 1904
Aurora Borealis, The.....Nov. 16, Dec. 16, 1903
Autoplex, The.....Feb. 1, 1903
Barclay Combination Quadruplex Rheostat.....July 1, 1903
Barclay's Direct Repeating Relay for Multiplex Circuits..July 16, 1902
Barclay Printing Telegraph System, W. H. Jones.....May 16, 1905
Barclay's Repeating Relay, Main Line Relay and Box Relay, Jan. 1, 1903
Barclay Typewriting Telegraph System.....Jan. 16, 1904
British Patent Office Rules.....Apl. 16, 1905
British System of Timing Messages.....Dec. 1, 1902
Buckingham Long Distance Page Printing Telegraph.....Sept. 1, 1902
Burry Page Printing Telegraph.....Apl. 1, 1903
Cables and Russo-Japanese War.....Apl. 1, 1904
Cable Station in Mid-Pacific, Our, Dr. Martin Crook.....Feb. 16, 1905
Central Cable Office, New York.....June 1, 1903
Central Telegraph Office, London.....Oct. 16, 1904; May 1, 1905
C. K. Jones' Automatic Telegraph Circuit Protector and Signaling Machine.....June 16, 1903
Collins Overland Telegraph.....May 16, 1903
Composite Circuits—Report Com. Assn. Ry. Tel. Supts., Sept. 1, 1904
Composite Teleg. and Telep. on Canadian Pacific Ry.....Mch. 1, 1904
Composite Telephone Lines.....Mch. 1, 1905
Crehore-Squire Automatic Telegraph System.....May 16, 1902
Definitions of Electrical Terms, Mch. 16, Apl. 1-16, June 1, July 1-16, 1904
Delany's, P. B., Automatic Telegraph System.....Mch. 16, 1903
Delany's, P. B., New System of Rapid Telegraphy.....Apl. 16, 1904
Direct Polar Relay Repeater of the Postal Telegraph-Cable Company.....Oct. 16, 1903
Earth Currents.....May 1, 1903
Engraving of Clarence H. Mackay.....Nov. 16, 1902
Engraving of Col. Robert C. Clowry.....Apl. 16, 1902
Engraving of the Late John W. Mackay.....Aug. 1, 1902
Field's, S. D., Amplifier.....Nov. 1-16, 1904
Field's, S. D., Quadruplex.....May 1-16, 1904
Flow of Electricity in the Earth.....Dec. 16, 1903
Ghegan Automatic Repeater.....June 1, Dec. 1, 1903
Ghegan's, J. J., Multiplex System.....Aug. 1, 1904
Gray Submarine Signaling Apparatus.....Jan. 1, 1904
Haud vs. Machine Telegraphy.....Sept. 16, 1902
Hard Drawn Copper Wire, F. W. Jones.....Nov. 1, 1903
Harmonic Telegraph, Prof. F. Lori.....Mch. 16, 1905
Improvements of Roberson Quadruplex.....Feb. 1, 1903
K. R. Law as Applied to Quadruplex Circuits.....Jan. 1, 1904
Lefley Telegraph Key.....Jan. 1, 1904
Life of Storage Batteries.....July 1, 1903
Low Resistance Relays...Oct. 1-16, Nov. 1, Dec. 16, 1902, Jan. 1, 1903
Midway Islands Cable Station.....July 1, 1904
New York Fire Alarm Telegraphs.....Aug. 16, 1903
Passing of the Quadruplex.....Aug. 1, 1903
Phillips' System of High Speed Telegraphy, J. W. Lariab, Nov. 1, 1904
Pollak-Virag System.....Mch. 1, 1903
Possibilities of Telephoning Over Tracks to a Moving Train, Mch. 1, 1904
Postal Telegraph-Cable Company, History of (with portraits of officials).....Feb. 1, 1904
Postal Telegraph-Cable Company Rules Governing Construction and Repair of Telegraph Lines.....Apl. 1-16, May 1-16, 1904
Printing Telegraph Systems, Modern High Speed, J. C. Barclay Nov. 1, 1904
Printing Telegraph Systems, Story of.....Jan. 1, 1903
Progress of Telegraphy During Last Thirty Years, W. Maver, Jr. Mch. 16, 1904
Progress in Fire Alarm Telegraphy.....Jan. 1, 1903
Proper Adjustment of Telegraph Apparatus.....Aug. 16, Sept. 1, 1904
Protection of Telegraph or Telephone Lines When in Hazardous Proximity to High Speed Lines.....June 1, 1904
Random Recollections of 145 Broadway, W. P. Phillips....Feb. 1, 1905
Rapid Telegraphy, P. B. Delany.....Nov. 16, Dec. 1, 1904
Recent Improvements in Telegraphy, J. C. Barclay.....Feb. 1, 1905
Reminiscences of New York Telegraphers a Quarter of a Century Ago.....Jan. 1-16, Feb. 16, Mch. 1, 1905
Repeaters:
- Atkinson.....Feb. 16, 1902
- Half-Milliken.....Feb. 16, 1902
- Horton.....Mch. 1, 1902
- Defective Loop.....Mch. 1, 1902
- Double Loop.....Mch. 16, 1902
- Lewis-McIntosh.....Sept. 16, 1903
- Milliken.....Jan. 16, 1902
- Neilson.....Feb. 1, 1902
- Weiny-Phillips.....Feb. 1, 1902
- Wood Double Loop.....Mch. 16, 1903

Rowland Multiplex Printing Telegraph System.....Sept. 16, 1903
Scott-Phelps-Barclay-Page Self-Winding Ticker.....Oct. 1, 1903
Simultaneous Telegraphy and Telephony.....Aug. 16, 1903
Skirrow Switchboard.....Nov. 1, 1903
Specifications in Construction of 25-foot Pole Line, American Telephone and Telegraph Company.....Feb. 16, Mch. 1-16, 1904
Stevens' Wheatsone Transmitter.....July 16, 1902
Stick Telephone, J. C. Barclay.....June 16, 1904
Stock Tickers, C. L. Healy.....Mch. 1-16, 1905
Storage Batteries.....May 1-16, June 1-16, July 1, 1902
Submarine Sound Telegraphy.....Mch. 1, 1904
Sullivan Outgoing Signal Recorder.....Mch. 1, 1905
Switchboard Practice at Intermediate Stations.....Dec. 16, 1904
- Ago, Jos. Hollos.....Feb. 16, 1905

Telautography.....Aug. 1, Dec. 1, 1904
Telegraph Alphabets.....Jan. 1, 1904
Telegraph and Weather Service.....Nov. 1, 1902
Telegraphic Bookkeeping, Jan. 16, Feb. 1, Mch. 16, Apl. 1-16, May 16, July 16, Aug. 1, Sept. 16, Oct. 1, 1903
Telegraph Operator in Railroad Service, J. B. Taltavall..July 1, 1904
Telegraphs in New England, W. P. Phillips....Apl. 16, May 1-16, 1904
Telegraphone, The.....June 16, 1902, Mch. 1, 1903
Telephone and Telegraph Bureau, U. S., Washington, D. C. May 1, 1903
Telephone in Railway Service.....July 16, 1902, Jan. 1, 1903
Telephony and Telegraphy at Internat'l Electrical Cong....Oct. 16, 1904
Testing Device, Useful and Simple.....Jan. 1, 1904
Transmitting Typewriter Wire Connections.....Feb. 16, 1904
Twentieth Anniversary Number.....Jan. 1, 1903
Twenty Years of Standard Time, W. F. Allen.....Feb. 1, 1904
Typewriting Telegraphs, L. S. Wells.....Aug. 1, 1904
Typo-Telegraph (Dr. Cardwell), F. J. Swift.....June 1, 1905
United States and British Telephones and Post Offices, F. W. Jones.....Apl. 1, 1904
Use of Modern Telephone as Applied to Railroads.....Jan. 16, 1905
Vibratory Telegraph.....Aug. 16, 1903
Washington as a News Centre.....Nov. 16, 1904
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 R. R. Operator.....Dec. 16, 1904
Wheatstone Automatic Duplex.....Apl. 1, 1902
When is a Storage Battery Fully Charged.....Aug. 16, 1904
Wind Pressure on Telegraph Structures, F. W. Jones.....Dec. 16, 1903
Wire Tables—How to Remember Them, C. F. Scott.....Apl. 16, 1905
Wireless Telegraphy at Sea.....Mch. 1, 1904
Yetman Transmitter (Description and Engraving).....Aug. 1, 1903

Books on the Submarine Cable.

The following list presents an excellent choice of books, with prices, treating on the submarine cable, about every phase of which is discussed. The works named are standard and are of a character that should insure ownership of the lot by every cable man who seeks to acquire a fuller knowledge of the subject of his profession. They are a library in themselves. They will be sent singly or collectively, as may be required, carrying charges prepaid, on receipt of price. Address J. B. Taltavall, TELEGRAPH AGE, 253 Broadway, New York:

Baines, G. M.—Beginners' Manual of Submarine Cable Testing and Working.....$3.50
Bright, Charles—Treatise on Submarine Cables.....$25.00
Hoskiaer, Capt. V.—Guide for the Electric Testing of Telegraph Cables.....$1.50
Fisher and Darby's—Students' Guide to Submarine Cable Testing.....$4.00
Kempe, H. R.—Handbook of Electrical Testing.....$6.00
Mullaly, John—The Laying of the Cable; or, The Ocean Telegraph.....$4.00
Parkinson, J. C.—The Ocean Telegraph to India.....$4.00
Smith, Willoughby—The Rise and Extension of Submarine Cables.....$9.00
Wilkinson, H. D.—Submarine Cable Laying and Repairing.....$5.00

Through the Book Department of TELEGRAPH AGE you can obtain any book desired. Send for the new catalogue.

Magnetic Club of Philadelphia.

On February 24 over one hundred members and guests of the Magnetic Club of Philadelphia participated in the most enjoyable meeting the club has ever held. In the absence of the president, Mr. John C. Sager, who, it was regretted to hear, was sick, Mr. F. W. Griffin, first vice-president, presided. After an address of welcome he introduced Mr. S. S. Garwood, as toastmaster, who, in his usual good style, took charge of affairs. After the disposal of the many good things he introduced Mr. Charles Selden, of Baltimore, our most recent member, who received a hearty cheer and delivered one of those addresses which have made him famous as an after-dinner speaker. He was followed by Secretary, C. B. Wood, who referred to the growth and success of the club, paying a well-deserved tribute to its founder, Mr. A. S. Weir, who not only received a loud cheer, but was compelled to take the floor. In response he delivered a very entertaining speech. Mr. Washington Devereux in his address spoke interestingly upon the telephone, and predicted that in twenty years the telephone would be so improved that we shall see the person to whom we are talking.

The progress of electrical railways was the instructive theme chosen by Mr. F. H. Lincoln. Among those present were: C. E. Bagley, E. C. Boileau, E. Burke, W. S. Burleigh, J. N. Donaldson, S. S. Garwood, F. W. Griffin, H. W. Hetzel, V. G. Hudgins, S. C. Ingalls, W. Koons, A. H. Lang, L. Lemon, F. E. Maize, R. C. Murray, Jr., J. A. McNichol, R. C. Mecredy, J. A. Moran, C. E. Murphy, H. McAleer, G. Potteiger, C. Selden, A. S. Weir, C. B. Wood, J. Wintrup, A. C. Wallace, H. Williams, J. H. Wilson.

Success Is Power.

"Strength is success. Strength to be, strength to do, strength to love, strength to live. It is not happiness, it is not amusement, it is not content. These will come, but they are not the object."

That is Edward Everett Hale's definition of success, says the Express Gazette. Success, he continues, is the real object in life. All the other definitions fail. When people say that men live to be happy, they do not express what they mean. A man's real motive should be the use of every power he has to the best he can achieve with it.

In endeavoring to solve the great problem it is well to keep Dr. Hale's wisdom in mind. Success is power. Deep in the human mind is the desire for power. All wish to attain to some measure of it. Every man who has developed his faculties to the best of his possibilities must be, and is, successful. There is no need for any man to envy another because that other has achieved greater fame, made more money, or stands more prominently before the public in a political capacity.

Every young man should determine to be practical—even poets can be that. Every young man should learn to concentrate. He should know himself. He should study his capacity and his limitations. A man undersized cannot be a soldier, nor a man with a crippled leg a sprinter. So there are limitations to the range of mental capacity. Knowing himself he should strive to utilize whatever ability he possesses to the utmost. Concentrate upon a purpose, and stick to it in the face of all obstacles. Hold to the theory that every man has a right to succeed—to use all his powers to the best advantage. Happiness and content will be met with at many a turn along the way.

Winnipeg, Man.

(Communicated.)

Winnipeg, situated at the junction of the Red and Assinaboine Rivers, lies almost in the center of the continent, and justly lays claim to being the hub city of America. Winnipeg is an Indian name signifying "gateway," and the city is appropriately named, for through it passes the commerce of the great plains of Western Canada, the largest and richest farming country in the world. Residents of Winnipeg have unbounded faith in its future, and have every reason to be proud of its progress, growing from a Hudson Bay trading post of some thirty years ago, until to-day it stands the third city in Canada, with an approximate population of 100,000. The city is growing very rapidly; last year the building permits passed the million-dollar mark. With its wide streets, the size and magnificence of its buildings, it will compare favorably with any city of its size in America.

Winnipeg was the first head office of the Great North-Western Telegraph Company. The company obtained its charter here in 1880. The head office was, however, transferred to Toronto the following year at the time of the amalgamation with the Dominion and Montreal Telegraph companies.

Winnipeg is one of the principal offices of the company, and has direct wire service from the floor of the Winnipeg Grain Exchange to the floor of the exchanges in Minneapolis and Chicago. In addition to this, they have direct communication with St. Paul, Toronto, Montreal and other large centers, which with their exclusive connection with the Western Union Telegraph Company, enables them to give an unequaled telegraph service.

The Vibroplex

In order to afford buyers of the Vibroplex, the most perfect telegraphic transmitter extant, an opportunity to deal conveniently with their nearest home agent, the following authorized representatives are named for their special benefit:

Chicago, Ill.—W. T. Plummer, Postal Tel. Co.
Cincinnati, O.—John Stangle, Western Union Tel. Co.
New York.—G. H. Wiser, Postal Tel. Co.
Philadelphia, Pa.—D. Good, West. Union Tel. Co.
Pittsburg, Pa.—F. J. McKenna, West. Union Tel. Co.

Hudson's Word Register.

Buyers of Hudson's Word Register, the standard and most simple and accurate device for counting the words written upon the typewriter, will consult their convenience by communicating with any of the following named authorized agents, preferably the one nearest to their place of residence:

Kansas City, Mo.—J. N. Harper, West. Union Tel. Co.
Philadelphia, Pa.—Daniel Good, West. Union Tel. Co.
Pittsburg, Pa.—F. J. McKenna, West. Union Tel. Co.

[Advertising will be accepted to appear in this columr at the rate of three cents a word, estimating nine words to the line.]

Rubber Telegraph Key Knobs.

Price fifteen cents, reduced from twenty-five cents. 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. Remit in one or two-cent stamps and address.

J. B. Taltaval:, TELEGRAPH AGE, 253 Broadway, New York.

Life's Panorama in New York.

The whirligig of life in Gotham is so rapid that it seems impossible to check the pace. One must go with the crowd or be trampled on. To show just how people and things keep on the go the New York Tribune summarizes the daily round in these expressive lines:

Every 40 seconds an immigrant arrives.
Every 3 minutes some one is arrested.
Every 6 minutes a child is born.
Every 7 minutes there is a funeral.
Every 13 minutes a couple get married.
Every 42 minutes a new business firm starts up.
Every 48 minutes a building catches fire.
Every 48 minutes a ship leaves the harbor.
Every 51 minutes a new building is erected.
Every 1¾ hours some one is killed by accident.
Every 7 hours some one fails in business.
Every 8 hours an attempt to kill some one is made.
Every 8½ hours some couple is divorced.
Every 10 hours some one commits suicide.
Every 2 days some one is murdered.

TEXAS

The wonderful developments of the South West is just now attracting the attention of investors and home seekers.

The publicity campaign that is now being carried on by Dallas and other Texas cities, has attracted the attention of the reading world. Many points of unusual interest have been brought to light and the people of the United States have a better conception of Texas than ever before. The mere statement that Texas has more than two hundred and sixty thousand square miles does not at once impress the reader, but when the statement is made and proven that Texas is larger than all the New England states combined; larger than the Middle Atlantic states, consisting of New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, West Virginia and the District of Columbia; larger than Germany; larger than France; larger than Austria or Hungary, the mind begins to grasp some idea of the immensity of this great state. Its development is commensurate with its size.

The enormous volume of business done by **THE POSTAL TELEGRAPH-CABLE COMPANY OF TEXAS** is in keeping with the rapid growth and development of the state. Mr. S. M. English, General Manager, Dallas, Tex., will be pleased to answer any inquiry and furnish any information concerning the growth, development and opportunities of the state.

A Valuable Book on Testing.

We are in frequent receipt of letters from correspondents wishing to ascertain the names of a book that will give detailed information on testing by voltmeter, ammeter, etc. We are pleased to announce that a new book just placed on the market, entitled "Electrical Instruments and Testing," by N. H. Schneider, price $1, covers the subject of testing thoroughly. It contains 110 pages and over 100 illustrations and tables. Because the book is low in price does not invalidate its claim to the best of its kind dealing with testing subjects, some of which are as follows:

The simple galvanometer; deflections not proportional to current; ampere turns; selection of size of wire for coil; tangents; the tangent galvanometer; influence of the earth on a galvanometer; the astatic galvanometer; compensating magnet.

Sensibility of galvanometer; figure of merit or constant; the Thompson reflecting galvanometer; forms of the D'Arsonval reflecting galvanometer; ballistic galvanometers.

Rheostats; resistance wires and their composition; laboratory resistance slab; shunts; condensers; keys; the reversing key; the Rymer-Jones key; commutator; the Kempe discharge key; the standard cell; Clark cell; Weston cell.

The voltmeter; the series ammeter; the shunt ammeter; types of instruments; sensibility; duplex instruments; potential indicators; millivolt and milliampere; multipliers; hot wire instruments; shunts; the wattmeter; Thomson inclined coil instrument; Queen instruments; Keystone instruments; G. E. potential indicator; electrostatic voltmeters; electro dynamometer type; electromagnetic type; reading instruments; parallax; care of instruments.

The Wheatstone bridge; post office bridge; how to use the bridge.

Forms of portable sets and how to use them; Queen bridge; Willyoung bridge; Whitney bridge; Sage ohmmeter; Evershed testing set.

Current flow and e. m. f.; galvanometer constant; direct deflection method; with Queen set; with voltmeter; testing resistance of galvanometer; five methods of battery testing.

The potentiometer; checking voltmeter; checking e. m. f.; use of various portable testing sets.

Charge and discharge of condenser; testing capacity and insulation of condenser; loss of charge method.

Cable testing; capacity; insulation and conductivity; locating cable faults; Varley test; Murray test..

Testing with voltmeter; testing wiring; insulation of generator; e. m. f. around commutator; measuring drop; testing high e. m. f. with low reading voltmeter; temperature and resistance; testing temperature by rise of resistance; testing filed coils; testing armature coils; plotting curves of tests.

Address all orders accompanied by the cash, to J. B. Taltavall, 253 Broadway, New York.

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A Semi-Monthly Journal Devoted to Land Line Telegraphs and Submarine Cable Interests

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The Edison Primary Battery is the Cheapest Form of Battery Energy.

300 **Ampere Hours, in the Shape of a Complete Set of Renewals, Cost Only** **$1.40.**

The Edison Primary Battery is the most dependable form of battery energy. It maintains its voltage absolutely constant until entirely exhausted. The elements are carefully manufactured and evenly balanced, and are all consumed by the same period of service. There is nothing to waste or throw away. There is no waste while the battery is idle and it operates with equal steadiness on open circuit or closed circuit work. Heavy currents may be drawn from it without injury or polarization. This is not true of other batteries of the copper oxide type, in some of which the oxide is enclosed as a loose powder in a perforated cylinder. Copper oxide for the Edison battery is first thoroughly oxidized in a muffle and then finely pulverized and pressed into compact briquettes, upon which a coating of copper is deposited to increase conductivity. The result of this is that the internal resistance of the cell, very low at the start, decreases with use. Loose copper oxide is not a good conductor, and when it is used depolarization is not complete, and there is considerable falling off in electro-motive force after prolonged and continued service.

In a test made by the Delaware, Lackawanna & Western Railroad upon the Edison and two other makes of copper oxide cells it is found that in making 65,451 signal movements the voltage of the Edison battery dropped from 8.5 to 8.1 volts. The next best battery made 65,445 movements, but dropped to 7.75 volts, while the third made only 63,535 movements and dropped to 7.25 volts. The difference was enough to make it pay to use the Edison cell.

If you will write us we will be glad to prove to you that the EDISON PRIMARY BATTERY is the cheapest and best form of battery energy that you can buy. The Edison battery has a capacity of work per unit weight greater than any other, either primary or secondary, each pound of battery supplying 85,480 foot pounds of work. It is easy to figure the theoretical amount of current that may be drawn from a battery as each ampere hour consumes just 0.12283 gramme of zinc. However, if there is "local action" the actual amount may be much less. By a special process 2% of mercury is incorporated in Edison zincs when they are cast, and in a test made by Dr. A. E. Kennelly upon four Edison cells taken from stock, it was found that, while 1444 grammes were being consumed by external current, only 6 were lost by local action.

ASK FOR BATTERY BOOK "T A."

THE EDISON MFG. CO.,

9 Lakeside Avenue, Orange, N. J.

31 Union Square, NEW YORK. **304 Wabash Avenue, CHICAGO.** **25 Clerkenwell Road, LONDON.**

TELEGRAPH AGE

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SOME POINTS ON ELECTRICITY.

The Storage Battery.

Part I.

BY WILLIS H. JONES.

The storage battery, judging by the number of letters received by this journal requesting information concerning the subject, seems to be an ever-interesting topic. The greater number of such letters are, of course, from laymen, while the remainder consist principally of inquiries regarding the merits of certain methods of arrangement, or the writers seek advice as to the advisability of utilizing such batteries in preference to the dynamo or other types under conditions stated.

It would obviously be impossible to cover the field of inquiry fully within the usual space allotted to articles of this kind. A general description of the storage battery, however, showing its inherent properties, should enable almost any one possessing ordinary intelligence to decide for himself, when in doubt, whether the employment of such a battery would be preferable for the purpose for which he desires to use it.

In the first place, it should be understood what a storage battery really is. The word storage, in connection with the current capacity of a cell, seems to mislead many into believing that the cell is a reservoir of electricity in the form of a current which is stored away for future use, as hay or any other commodity might be placed in a barn till needed. The fact is there is no electric current whatever stored away, but there is an electromotive force of two volts so held in reserve, if we may be allowed to apply the expression here, on the plates of the cell by the action of a current of electricity from another source which must first be passed through the liquid in the storage cell in order to develop the said two volts pressure. The current, therefore, which the storage battery provides is not taken from its ware-room, so to speak, but is created in the external circuit it feeds during the cell's activity by means of its electromotive force in exactly the same manner as if it was a dynamo machine, the quantity, of course, being regulated by Ohm's law $E \div R = C$.

The rating capacity of the cell in ampere-hours also tends to suggest the idea that current itself is stored away in quantities as indicated by the markings. What should be understood by the capacity mark, however, is that the plates of the storage cell have been constructed of a size, and charged with a sufficient volume of current from an outside source to insure the maintenance of the two volts pressure for a period of time long enough to create and pay out to external circuits a quantity of current equal to the marked capacity of the cell, as indicated in ampere-hours, before becoming exhausted.

The storage cell possesses practically no internal resistance, as compared with that of bluestone batteries. In this respect it is also like a dynamo constructed for large quantities of current. It has the advantage of the latter, however, inasmuch that it is able to furnish a steadier current under nearly all conditions than the dynamo, because of the absence of brushes and other moving parts required in the operation of the mechanical generator.

Sudden demands for great alterations in the volume of current required does not seem to affect the value of the electromotive force of the storage battery to any appreciable extent. A like change in current volume flowing through the coils of a dynamo, however, tends to temporarily disturb the momentum of the rotating armature owing to the reaction of the current therein, as well as to cause momentary sparking at the brushes. The development of either of these conditions naturally affects the value of the elec-

tromotive force generated. Of course, in the larger and better classes of machines these effects are practically harmless, but still sufficiently pronounced to make it necessary to assign dynamo currents to second place in a competitive test for constancy. The storage battery, therefore, may be safely substituted for the constant pressure dynamo method, with equal and often better results, so far as the respective merits and outputs are concerned, other conditions being equal. Of course, the matter of room space and charging facilities must be taken into consideration, but that is a mere matter of detail.

We have purposely enlarged on the comparative efficiencies of the storage and the dynamo methods, as information on that point seems to be sought quite generally by our numerous correspondents. Like other valuable devices, the storage battery must be not only properly handled for best results, but should be selected as to size or capacity in an intelligent manner, otherwise its output will be greatly diminished. This hint refers particularly to the rate of charging and discharging the cell. It is too generally accepted as a fact that a cell marked, say 100 ampere-hours, will deliver practically that total amount at all times before becoming exhausted. Such is not true, however, for that all depends upon the rate per hour at which the current is drawn on, and has a direct bearing on the size of the cell itself. Under certain conditions a so-called one hundred ampere-hour cell will yield as much as one hundred and twenty ampere-hours in all, after having been fully charged, while under different conditions sometimes less than eighty-five ampere-hours are obtained therefrom. The same rule applies to the charging of storage cells.

In the next installment of this article we shall endeavor to describe some approved methods of charging these batteries and show how the cells may be made to work full time and to the best advantage.

(To be continued).

[Important articles by Mr. Jones, appearing in back numbers, dating from January 1, 1904, copies of which may be had at twenty-five cents apiece, are as follows: A Useful and Simple Testing Device, January 1, 1904; The Bad Sender, His Fast and Future, January 16; The Transmitting Typewriter Wire Connections, February 16; A New Transformer for the Alternating Current Quadruplex (J. C. Barclay, patent), March 1; Definitions of Electrical Terms—Unabridged, March 16 to April 16, inc., June 1 to July 16, inc.; The Future Quadruplex (S. D. Field's invention), May 1-16; The Ghegan Multiplex, August 1; Proper Adjustment of Telegraph Apparatus, August 16-Sept. 1; Practical Information for Operators, October 1 to Dec. 1, inc.; Switchboard Practice at Intermediate Stations, December 16; Definition of the Terms Cycle, Period, Frequency, etc., Diagrams Interpreted, January 1, 1905; Lessons from the December Storm, January 16; The Bonus Wire, February 1; A Few Useful Methods, February 16; Co-operation, A Hint for Wire and Quad Chiefs, March 1; Measuring Resistance by Voltmeter Alone—Something About Ground Wires, March 16; Elementary Information Concerning Household Electrical Appliances, April 1 to May 1, inc.; The Barclay Printing Telegraph System, May 16; Polarized and Self-Adjusting Relays for Single Line Circuits, June 1; Limitations of Quadruplex Circuits, June 16; Electric Power From the Clouds, July 16; Concerning Condensers and Retardation Resistance Coils, August 1; District Call Box Service, August 16; The Art of Studying, Sept. 1; Other Methods of Splitting a Loop, Sept. 16; The Sextuplex, Oct. 1; A Few Questions Answered, Oct. 16; Positive and Negative Currents, Nov. 1; The Education and Evolution of a Chief Operator, Nov. 16; A Study of an Electric Circuit—Definition of the Principal Terms of Factors Which Regulate its Practical Output, Dec. 1; The Telephone—First Principles, Dec. 16, and Jan. 1, 1906; Questions Answered, Jan 16; The Dynamo—Series, Shunt and Compound Wound, Feb. 1-16, March 1.]

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

Business Notices.

On another page will be found the advertisement of the Central Typewriter Company, 280 La Salle street, Chicago. This concern is the successor of the Telegraphers' Typewriter Company of that city, and Mr. O. T. Anderson, well known in telegraph circles in the Lake City, still remains at its head. Under his personal supervision it is fair to assume the re-organized company will continue to prosper. A branch office of the company has been opened at 22 East Mitchell street, Atlanta, Ga., under the management of W. L. Gilbert.

Although it is a well-known fact that the J. H. Bunnell Company, 20 Park place, New York, have for years maintained a record for a high standard of excellence in the class of telegraph and other goods designed for electrical purposes, manufactured by them, too much emphasis cannot be laid on this fact. It is always a source of satisfaction and pleasure to place an order with the assurance that the finished product will measure up fully to design and all requirements. This is a fine reputation to acquire, and in the instance of the Bunnell company is the outgrowth of years of conscientious endeavor. Particularly in regard to the manufacture of telegraph apparatus in which this house has long been engaged, it may be said that it has no superior. This is due largely to the fact that the controling heads ever since its establishment have been telegraphers, hence the practical knowledge that has been brought to bear and given direction to this specialty.

The Remington Typewriter Company has issued an exceedingly neat and carefully prepared little brochure especially addressed to telegraph operators, bearing on its front cover the legend, "Do you use 'a mill?'" Who other than a telegraph operator would understand the word "mill" as applied to a typewriter? The little volume points out the advantages accruing to the operator in becoming proficient in the use of the machine, not only as a means of making his position easier, but also as leading to promotion, and abounds in a lot of interesting, practical and common sense discussion of the subject. Its author evidently is treading on familiar ground, for he handles his topic in a way that shows he "knows his business." Operators will be interested in the little work, for it is well worth having, and as a request for it simply is all that is needed to secure a copy, they should not fail to make their wants known. Address the Remington Typewriter Company, 325-327 Broadway, New York.

TELEGRAPH AGE will furnish operators with just the kind of practical information they require.

Personal Mention.

Mr. S. Symons, chief superintendent of the Central Telegraph Office, Johannesburg, South Africa, was in New York in the early part of this month and inspected the telegraphs in this city before sailing for England on his way home.

Mr. Thomas A. Edison and family have gone to their Florida plantation, where they are spending the entire month of March, returning early in April. This holiday is one that Mr. Edison has anticipated with much zest after the hard work of the winter.

Mr. Dennis J. Hern, formerly general manager of the Mutual District Messenger Company, of Boston, has resigned his position on the Boston Board of Health and has been nominated superintendent of the Lamp Department of Boston by Mayor Fitzgerald.

Mr. B. M. Downs, general manager of the Brookfield Glass Insulator Company, of New York, accompanied by his wife, has returned from a business and pleasure trip to California. While on the Pacific Coast Mr. Downs took occasion to pay his respects to numerous telegraph officials.

Obituary.

William J. Byrnes, aged fifty-two years, a prominent and brilliant telegraph operator, died at his home in Pittsburg, Pa., on February 25.

James H. Ward, a well-known telegrapher, a native of Nova Scotia, for many years chief operator of The Associated Press at Dallas, Tex., and for the last three years connected with the Chicago office of that association, died of heart disease in Chicago on March 2.

Joseph T. Ramsey, aged forty-two years, manager of the Chamber of Commerce branch office of the Postal Telegraph-Cable Company, Milwaukee, Wis., died in that city after a brief illness, on February 28. He was a brother of Henry J. Ramsey, night manager of the Postal at Milwaukee.

Albert Crary, aged 58, an old-time Western Union telegraph operator, of Cincinnati, O., who was well known to operators throughout the country, died at his home in Dayton, Ky., March 3. He suffered from rheumatism and pneumonia. Crary was for many years operator at the Chamber of Commerce, Cincinnati. This position he gave up a few years ago. His fifty-eighth birthday occurred the day before his death.

Wireless Telegraphy.

A patent, No. 813,975, for wireless telegraphy, has been issued to J. F. King, Washington, D.C.

It is reported that Robert Anderson, a newsboy of Venice, Cal., has discovered a process for tempering copper to the hardness of steel. It is said that he has an ax and several knives of fine quality made from copper.

The Savannah Steamship Company is installing the American De Forest wireless system on all of the steamers of their fleet.

The government of Cuba has sanctioned the expenditure of $20,000 on construction and repairing telegraph lines and wireless telegraph installations.

The Postmaster-General, in the English House of Commons, has brought in a bill to continue the Wireless Telegraphy Act of 1904, entered into with the Marconi Wireless Telegraph Company.

David J. Hill, United States minister at The Hague, reports that the Netherlands Government has issued an order respecting the exchange of wireless messages, and fixing a provisional tariff in regard thereto.

Once more it is announced that it will not be long before there will be a wireless telegraphic service between this country and England. It is stated that the preliminary difficulties have been overcome, and Mr. Marconi hopes that the service will be in operation by fall.

The United States circuit court at New York has awarded to William Marconi priority as the originator of wireless telegraphy as claimed in his suit against the De Forest company. The judges say Marconi was the first to describe and the first to achieve the transmission of definite intelligent signals by means of the Hertzian waves.

Wireless telegraph tests are to be made for the next thirty days by the officers in charge of the various stations established by the Navy Department, to determine, if possible, the cause of the many failures to receive and send messages at sunrise and sunset. Repeated tests have shown this to be the case, and it is said that the navy operators were the first to make the discovery of this strange and important phenomenon.

The ingenuity of three Newport, R. I., schoolboys in "tapping" the air recently for wireless messages transmitted by the Government and at the same time sending messages to passing ships equipped for such a purpose has interested Commander Albert Gleaves, of the United States Naval Torpedo Station at that point. He began an investigation to learn who it was that was both sending and receiving the wireless messages, with the result that he found a well-equipped plant conducted by boys, the eldest of whom is but seventeen years of age.

Jefferson M. Levy, of New York, who has just arrived in London, bought property in New York City by wireless from his cabin on the steamer Kaiser Wilhelm der Grosse in midocean. Mr. Levy had the Maiden Lane property submitted to him by a broker as he was sailing. He thought well of it, particularly as he already owned the adjoining buildings, but there was not time enough to arrange the terms of the deal before

the next morning. Negotiations with Mr. Levy were kept up, however, through the Marconi station at Nantucket, and later through that at Sable Island. The last exchange of messages was effected in midocean through another liner, between the Kaiser and the shore, until all the details of the transaction had been arranged.

As evidence of the progress being made in connection with the adoption and application of wireless telegraph installations to the class of communication to which this system has already become or is becoming adapted, a foreign exchange received particulars of the installations now supplied by the Gesellschaft für Drahtlose Telegraphic of Berlin. This list comprises a total of 518 stations, made up as follows: Germany, 169; Russia, 112; United States, 65; Austria Hungary and Sweden, 24 each; Holland, 23; Denmark, 14; Norway, 12; Spain and Portugal together, 10; Argentina, Brazil, China, 9 each; Netherlands India, 7; Switzerland, 6; Mexico, 4; Bosnia, Cuba, England, Finland, France, India, Peru, Siam, Tonkin and Turkey, 2 each; Uruguay, 1.

Mr. Marconi tells a weird story in connection with his system of wireless telegraphy. There is a station off Cape Clear, the utmost point of land to the westward of the British Isles. Here are received final messages dispatched by ships outward bound and the first hail of vessels that have ccrossed the Atlantic steering east. To this lonely station there comes shortly after the stroke of midnight, a mysterious message, untranslatable, incomprehensible. But always at a certain point, varying night by night, there is delivered one word that is ever the same. It is recognizable only by its unvarying sign. It belongs to no language known to this planet. For two years the mysterious communication has never missed arriving invariably between midnight and the stroke of one in the morning. Mr. Marconi's explanation of the phenomenon is as striking as the incident itself. He believes it is Mars endeavoring to communicate with its sister planet. Why the message should exclusively reach this particular spot on earth, what Mars wants to say, and wherefore the unrequited patience of nightly repeating the communication through two years, are matters to be guessed at. That the mysterious message arrives at the times and in the manner indicated is a fact for which Mr. Marcon vouches.

Resignations and Appointments.

The following changes have occurred in the Western Union Telegraph Company's service:

Mr. Daniel O'Hara has been appointed manager at Goshen, N. Y.

Mr. C. Mantz Doll has been appointed manager at Frederick, Md., vice William M. Crimmins, resigned.

The following changes have occurred in the service of the Postal Telegraph-Cable Company:

Miss Jennie B. Wright, has been appointed manager at Lockport, N.Y., vice W. C. Casey, transferred to the Buffalo office.

Mr. Wyatt E. Berry, of Portsmouth, N. H., has been appointed manager of the office at that place, vice George E. Morrill, resigned.

Mr. Daniel Carter, for many years with the Postal Telegraph-Cable Company at Boston, Mass., and for a short period manager of that company's interests at Springfield, Mass., is now with the American Telephone and Telegraph Company, at Boston. He is succeeded at Springfield by C. H. Goddu.

General Mention.

The mileage of overhead and underground telegraph wire, etc., in England is as follows: Aerial, 3,433,911; underground, 225,748, a total of 3,659,659.

John Barrymore, the actor, is to accompany William Collier on his Australian tour, and will take the part of the telegraph operator in the play of "The Dictator."

Mr. John M. Bell, manager of the Postal Telegraph-Cable Company, of Tacoma, Wash., was recently tendered the mayoralty nomination of that city by a large delegation of his fellow-citizens.

The Typewriting Telegraph Company has been organized in New York with a capital of $250,000. The directors are W. W. Crehore, of Elizabeth, N. J.; W. C. Sherwood, of Jersey City, N. J., and A. F. Garbe of New York.

Hon. George Hall of Ogdensburg, N. Y., an old-time telegrapher, has recently added to his many gifts to public institutions of that city, a further donation of $2,500 for the building of a wing to the city hospital.

Enormous sums of money are frequently expended by various governments to rectify errors, often apparently trivial, in government printing. The United States, some years ago, destroyed 4,000,000 telegraph forms owing to the misspelling of a single word.

Lamprecht Brothers & Co., brokers, of Cleveland, O., announce the appointment of F. E. Rudenauer, at present chief of their telegraph service, as floor manager of their stock room. E. C. Monroe has been appointed chief operator and F. W. Agnsio has been added to the staff.

Germany's underground telegraph system dates from 1870. France followed suit, in 1879, as the result of a great storm that isolated Paris in 1875. Up to date her system has cost $36,000,000, but is believed to have more than paid for itself. Lines constructed in 1880 are still in excellent condition.

Mr. W. O. Coffe, the inventor of the Mecograph, is employed as a telegraph operator by

the Publishers' Press at Cleveland, O. Mr. Coffe has assigned his patent to the Mecograph Company of Cleveland, O. Mr. Coffe filed his patent application on January 11, 1904, and the patent was awarded on February 13, 1906.

Gilbert McDonald, twenty-three years old, a railroad telegraph operator at Carmi, Ill., is totally blind, having lost his eyesight by fever when two years of age. When fifteen years old he began the study of telegraphy, an art he soon acquired. He now is said to be expert as an operator as well as in the use of the typewriter.

Recharging dry batteries may be accomplished, it is said, by pouring about a gill of dilute sulphuric acid (three parts water, one part acid) through two small holes bored in the top of the battery, the solution percolating down through the interior. The holes are then plugged up with common soap and the battery allowed to stand about twelve hours before using.

Mr. John G. Allen, of Raleigh, N. C., in a recent letter renewing his subscription writes: "In 1894 your Lynchburg, Va., agent, Mr. C. J. App, told me that he had sent in my subscription to TELEGRAPH AGE and wished me to remit to him to cover the same. I complied with his request and have been renewing ever since and have never regretted Mr. App's action."

Mr. Thomas T. Cusack, one of the expert telegraph operators of the fire alarm telegraph branch of the New York Fire Department, is an old-time newspaper man. He was employed on the New York Press not more than a decade ago. He was with one of the big press associations prior to that. His newspaper experience has proven of great value to him since he became a member of the staff of telegraph operators at fire headquarters.

The Cable.

The annual meeting of the directors of the Commercial Cable company took place in New York on March 5. The present officers were all re-elected.

Francis A. Taylor, formerly electrical engineer of the Eastern Extension Company, London, England, who was retired on pension some time ago, committed suicide by shooting himself on January 20, at Liverpool.

Secretary Shaw submitted to Congress March 8 an estimate of $927,000 for the construction of a cable from Key West, Fla., to Guanatamo, Cuba, and thence to the Panama Canal zone. The estimate was made by General Allen, chief signal officer of the army, who prepared it at the request of Secretary Taft.

Cables remaining interrupted March 12 were those of Port Arthur-Chefoo, interrupted March 1904; Cadiz-Teneriffe, interrupted July 20, 1905; St. Jacques-Haiphong, interrupted February 14, 1906; Tangier-Cadiz, interrupted February 18, 1906; Jamaica-Colon, interrupted January 9, 1905; Martinique-Port Plata, interrupted October 30, 1905; Cayenne-Pinheiro, interrupted August 13, 1902; Curacao-Venezuela interrupted January 12, 1906; St. Lucia-St. Vincent and St. Vincent-Grenada interrupted, cutting off St. Vincent and Barbados, February 16, 1906.

With the approval of the Secretary of War, Congressman W. C. Lovering of Massachusetts has introduced a joint resolution authorizing the Secretary in his discretion to sell or lease the whole or any part of the telegraph and cable system of the United States in Alaska and to pay the proceeds into the treasury.

The Electrical Review, of London England, in its issue of February 23, prints a lengthy article on the wonderful progress made by the Germans in the manufacture of submarine cables, embracing besides the making of the cables, the building of the cable steamers and the laying of these cables in all parts of the world.

Mr. Charles Bright, F. R. S. E., gave a lecture at the Royal Military School, Chatham, England, February 9, on submarine telegraphy. In the course of his lecture, fully illustrated by lantern slides, remarks the Electrical Review, of London, Mr. Bright described the methods of transmitting electrical signals through cables, and mentioned that nowadays the speed of working was only limited by the type of cable in accordance with traffic requirements, thus showing that wireless telegraphy for commercial purposes had a considerable task ahead before it could compete successfully with cables.

The Bureau International des Administrations Télégraphiques has just issued its report for the year 1905. The countries adhering to the Telegraph Convention are as follows: Germany, Argentina, Australia, Austria, Belgium, Bosnia-Herzegovina, Brazil, Bulgaria, Cape of Good Hope, Ceylon, Portuguese Colonies, Crete, Denmark, Egypt, Spain, France, Algiers, Great Britain, Greece, Hungary, British India, Dutch-India, French Indo-China, Italy, Japan, Luxemburg, Madagascar, Montenegro, Natal, Norway, New Caledonia, New Zealand, Orange River Colony, Holland, Persia, Portugal, Roumania, Russia, Senegal, Servia, Siam, Sweden, Switzerland, Transvaal, Tunis, Turkey and Uruguay. The telegraph and cable companies are divided into three groups. Under the head of adherents are the Black Sea, Commercial, Deutsch-Atlantische, Eastern-Europe, French, German-Dutch, the Rio de la Plata, Telegraph and Telephone, Direct Spanish, Direct West India, Eastern, Eastern Extension, Great Northern, Halifax and Bermudas, Indo-European, South American, Spanish National, West African, West Indian and Panama, and Western Telegraph companies. The second group are constituted by those which, though not official adherents, generally conform with the service regulations, and the following

names appear here: African Direct, Amazon, American Telegraph and Cable (Western Union Company), Anglo-American, Central and South American, Commercial Pacific, Direct United States, Eastern and South African, Europe and Azores, Pacific and European, and West Coast of America Telegraph companies. The third group is composed of the British North Borneo, Cuba Submarine, India-Rubber, Gutta-Percha and Telegraph Works, Mexican, River Plate, and United States and Hayti Telegraph and Cable companies. These companies only correspond with the Bureau International through one or other of the companies named.

The Railroad.

The American Railway Association will meet at Chicago on April 25.

The next annual meeting of the Association of Railway Telegraph Superintendents will be held at Denver, Colo., on June 20. Mr. P. W. Drew, of the Wisconsin Central Railway, Milwaukee, is the secretary of the association.

The periodical dinner of the Railroad Superintendents Association of New England was held at the Café Martin, New York, on the night of March 3. The association is composed of prominent railroad officials throughout New England, many of whom are ex-telegraphers. Among those present were C. E. Lee, E. A. Smith, S. A. D. Forristall, G. H. Folger, H. C. Robinson and J. B. McMann, of the Boston and Maine Railroad; A. W. Martin, W. L. Derr, I. N. Marshall, E. H. Morse, N. E. Smith, J. C. Sanborn, A. R. Whaley, George T. Taylor, H. J. Hill, W. R. Mooney and R. Fitzmorris, of the New York, New Haven and Hartford Railroad; W. K. Hallett, Bangor and Aroostook Railroad; A. H. Grovenor, H. W. Davis, J. K. Hopson, C. L. Gilpatrick and others.

The next meeting of the Railway Signal Association will be held in the Great Northern Hotel, Chicago, Monday, March 19, beginning at 10 o'clock sharp. There will be three sessions. At this meeting a new constitution and by-laws will be presented for adoption. Several papers will be read, including one by F. B. Corey, of the railway engineering department of the General Electric Company, whose topic will be "Charging of Storage Batteries from Alternating Current Circuits;" one by W. N. Spangler, supervisor of signals, West Jersey and Seashore Railroad, on "Substituting Track Circuits for Detector Bars," and another by W. A. D. Short, signal engineer, Illinois Central Railroad, entitled, "Power Operated Distant Signals."

Recent Telegraph Patents.

A patent, No. 813,710, for a relay, has been granted to H. Johannsen, Stockholm, Sweden.

A patent, No. 813,512, for a circuit closer for telegraph keys, has been issued to Herbert R. Nevens, of Portland, Me.

A patent, No. 813,184, for a relay, has been obtained by Angel Vera and Louis G. Vera, of Queretaro, Mexico. In combination with an armature are opposed electro-magnets, one arranged to operate more rapidly than the other, the more rapid of the magnets actuating the armature upon closing of a circuit, and the other magnet actuating the armature upon opening the circuit.

The following patents have expired:

399,154; automatic telegraphy. J. O'Neil, New York.

398,833; printing telegraph. F. H. W. Higgins, London, Eng.

Recent New York Visitor.

Mr. I. McMichael, vice-president and general manager of the Great North Western Telegraph Company, Toronto, Ont.

To Preserve the Lincoln Farm.

The Lincoln Farm Association is the title of an organization for the purpose of converting the Lincoln birthplace farm into a national park as a memorial to the great President. A movement of this kind should appeal to the best emotions of every patriotic American. The proposition has received the endorsement of the leading men of the nation from President Roosevelt and former President Cleveland down. Men prominent in affairs are united in giving the project commendation. The initial movement was started by Mr. Collier, of Collier's magazine, and in order to save the property he purchased it. He has conveyed the deed of the property to the Lincoln Farm Association, and contributions of any sum not less than twenty-five cents or more than twenty-five dollars are now solicited from the people at large in order to carry out the plan proposed of converting the farm into a national park. Contributions of whatever amount, small or large, will constitute the giver as a perpetual member of the Lincoln Farm Association, and he will receive a handsomely engraved certificate of membership, the amount of the contribution not, however, being made public. The president and trustees of the association are among the most prominent men of the nation. The invitation to subscribe will appeal strongly to telegraphers, from the fact that Clarence H. Mackay, president of the Commercial Cable Company and of the Postal Telegraph-Cable Company, is the treasurer of the association, with offices at 74 Broadway, New York.

"The Strenuous Life," which present day conditions force on every man, and upon many women who are or who desire to be self-dependent, demands not only firmness of purpose and resolution of will, but intelligent thought and wisely directed action. With these qualities judiciously applied the "strenuous life" becomes the successful life.

The Automatic Telegraph as a Public Utility.

BY ROMYN HITCHCOCK.

(Continued from page 88.)

Automatic working possesses such distinct advantages in speed, accuracy and economy, that it will as surely replace hand methods for general commercial telegraphy as machinery has taken the place of hand labor in other arts. Yet despite the facts, established beyond dispute, telegraph authorities of the old school in high repute, seem quite unable to acknowledge the obvious consequences—or is it that they are unwilling? For example, quoting from no less authority than a president or chief electrician of one of the companies, we find these words: "Professor Morse did not realize that he had invented the best, cheapest and quickest system of telegraphy that has been introduced up to the present time." Further: "I know of no automatic system that can be satisfactorily employed to move the great daily telegraph traffic of the country so expeditiously and economically as is done by the present Morse." In another place we are told that the writer knows of no better way to increase facilities of communication than by putting up additional wires!

The famous Wheatstone automatic invention owes its present high state of perfection to the far-sighted policy of the telegraph authorities of Great Britain, who recognized, many years ago, the benefits of automatic working. The Wheatstone apparatus, however, is not sufficiently rapid to utilize conductors up to a speed nearing the electrical limitation. Its speed is restricted mechanically while the ideal system must have only electrical limitation. The Wheatstone has proved a valuable adjunct to key working wherever it has been applied, finding its most extended use perhaps in Great Britain; but its efficiency falls short of what is required to establish automatic telegraphy on a plane by itself.

A rapid automatic system cannot be properly utilized if made supplementary to hand methods. The cost of a nation's telegraphs is determined by the expense of the prevailing methods used. The full benefits of automatic working can only be enjoyed when all its economies are utilized. It must be the great system of through lines, and also of all lines connecting centres of considerable population. It must be the trunk line system, comparable to the trunk line railroads on which fast expresses travel, the short lines branching out from the main line like branch railroads, which act as feeders to the main line.

Wherever the volume of business offered exceeds the carrying capacity of a wire operated by hand methods, it is much cheaper to add a set of automatic machines than to construct and maintain an additional wire. This is independent of any great increase in speed, for there is no reason why an automatic machine should not be run as slowly as may be desired. The proposition is self-evident when long lines are concerned, but it has advantages for short lines also. The question hinges not on the length of the line but on the volume of business which low prices will develop. There are always some people who wish to communicate with other people in neighboring towns. A letter is too slow, requiring a day to get a reply, the telegraph is too expensive for everyday use, the telephone may not be available, but a letter-telegram would meet the requirements admirably. A wire only ten miles in length can be advantageously equipped for automatic working if the population is large enough to make sufficient business. A letter telegram saves the time of train transportation as well as the attendant delays of hours when there are no trains, and the time of collection of mail sacks and distribution of their contents. It is intermediate between a two-cent letter and a short telegram and is not usually sufficiently urgent to require instant delivery.

So long as the telegraph administration aims to give the least possible service for the highest price it can exact from patrons, there will be no need for high-speed methods. But the situation changes when we consider the effect of the great reduction in charges which rapid automatic operation renders possible. The immediate effect will be an incalculable increase in the volume of business offered. The influence of costs upon the volume of correspondence has been investigated in different countries, and statistics are available. But we have no experience of the effect of such large reductions in telegraph charges as the rapid automatic makes possible and, indeed, advisable if not imperative from a business standpoint. To assume that if prices are reduced to one-tenth, ten times as many telegrams of fifty words each will be sent as of ten-word telegrams now, is a conservative estimate.

The great, universal benefit of thus cheapening telegraphy will be to make the telegraph for the first time a real public utility, a medium of correspondence available to all. The somewhat larger cost over mail correspondence will be offset by the advantages and benefits of electrical speed. The ideal plan of delivery of such communications would be through local post-offices.

When one considers the subject in detail it becomes clear that electric signaling ought not to be expensive. The cost being principally in the wire plant, it can easily be shown that a sufficient number of messages at a nominal price for each,—a number far below the carrying power of the wire —would suffice to make investment in a line of copper 1,000 miles long exceedingly profitable. The fundamental question, therefore, is, commercially speaking, one of electrical speed limitation —how rapidly the signaling can be done in practice? This fact being known there is a determinable charge for letter-telegrams which will attract a maximum of business and yield the largest re-

turns on the invested capital.

Those who regard the telegraph as necessarily an expensive, emergency service rather than a possible public utility and convenience, will scarcely be prepared to credit the cheapness of automatic methods. Since the cost of a message is determined by the volume of business carried by a wire, the relative costs of telegraphing by different methods depend primarily upon the item of transmission. For clearly the cost of preparing messages on tape for machine transmission, and of transcribing them at the receiving station, cannot enter as a prime factor in the comparison, since these costs are relatively trivial and the operations are common to all methods, although carried out in somewhat different ways; in fact, the cost of this service for automatic working is less than it is possible to make it for hand working. In any case, these are costs which the telegraph correspondence must necessarily bear; but in the ideal automatic system it is not necessary that this service should be rendered by the telegraph company. It can, and undoubtedly will be done, principally by typewritists and stenographers in private business offices, the telegraph corporation being only the transmitting agent of correspondence thus privately prepared, no word of which becomes known to the telegraph operators. Thus the telegraph charges would be for transmission of messages only, and all messages thus prepared are absolutely private and secret.

The discovery of a method whereby the static capacity of a telegraph line is utilized to increase the speed of signaling is one of the most important. In machine telegraphy the signaling impulses must be accurately recorded at a speed of 250 to 300 marking impulses in a second of time. Experimentally, utilizing the static charge of the line, records have been made at a speed of 2,000 marks a second.

In the light of the remarkable changes brought about within a generation in the world of varied activities, one cannot predict the effect of high-speed telegraphy upon daily, social and business correspondence. To say that it is destined to be mostly carried by electric impulses over wires, leaving but a comparatively small proportion, the most voluminous and heavy, to follow as letters on railway trains, may seem wildly fanciful, incredible. Perhaps it is so. But does anybody know? Would not the benefits of quicker communication be universally felt? And when once recognized would they ever be relinquished? The whole question is one fundamentally of practicability and costs.

A simple estimate will indicate the commercial signficance of high-speed transmission and throw some light upon the possibilities before us. Consider messages privately prepared on tapes for transmission, by use of a machine like a typewriter, and transcribed by the persons receiving them, so that the charge is made for transmission only. Taking a line 1,000 miles long, working at a speed of 1,000 words a minute the charge might be five cents for messages of 50 words. The annual income of one 1,000-mile wire at this rate would easily exceed a quarter of a million dollars.

Pole Support for Swampy Ground.

The American Telephone Journal has this to say about the pole support for swampy land where the mud is too soft and too deep to give a solid bottom and firm support for a pole:

"It is considered good practice to support poles in such locations and hold them in line by simply bolting to the foot of the pole two pieces of creosoted pine planking, crossing at right angles. This forms a very cheap support and one which is easily applied. It is sometimes necessary to reinforce the pole by putting in a push and brace, the foot being of the same construction as that for the base of the pole. An additional precaution is sometimes taken with lines exposed to strong winds. In this case a hole about the base of the pole is filled with concrete, which acts as a counterweight to assist in holding it upright.

"Where neither of these methods could be applied on account of the extreme softness of the ground, it is customery to plant the pole and to bolt to it just above the ground and at right angles to the line, two pieces of planking about ten feet long. To these two planks are nailed short pieces of plank about three feet long, these planks being nailed at right angles to the ten foot plank. Four pieces of planking are then fastened, two on each side of the pole, extending from a point on the pole about five feet above the ground to each end of the before-mentioned ten foot plank.

"With this form of construction the weight of the poles and line is distributed over a large bearing surface in such a manner as to not only prevent the line from sinking, but to brace it against a tension tending to tip the pole to one side."

William Marconi to Lecture Before the New York Electrical Society.

William Marconi will lecture before the New York Electrical Society, at the auditorium of Horace Mann School, Teachers' College, Columbia University, Wednesday evening, March 28. Word has been received that Mr. Marconi will make a special trip to this country to deliver this lecture, which was posponed from January 16 because of Mr. Marconi's illness.

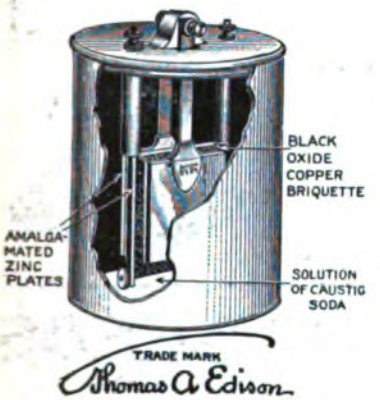
Our advice to every young man is: Know one thing thoroughly. Specialization is the order of the times and concentration is a matter of great importance. It is not the man who knows a little of everything that succeeds or is sought after; it is the man that knows one thing and knows that one thing better than anybody else. Learn to do one thing well.

Chapter II

ON AMPERES and SIGNALS

The amount of electric current that may be drawn from a primary battery, operating signals or telegraphic instruments, depends, first, upon the weight of the zinc electrode (each ampere hour consumes just 1.2283 grammes), and, second, upon the amount of local action; that is, consumption of zinc without any current in the external circuit. In some types of batteries local action is considerable and it will be large in any battery where the zinc electrodes are not thoroughly amalgamated with mercury. The usual method of amalgamating is by rubbing mercury or salts of mercury upon the outside of the zinc. The result of this is that only the outside is affected and, if the zinc is entirely consumed in the battery without reamalgamation, during the latter part of its life it is attacked by local action.

Now, although mercury boils at 680°F., and is easily affected by sulphur fumes, we have discovered in the manufacture of EDISON batteries a method by which we can incorporate 2% of mercury in the zinc electrodes as they are cast. This insures that the mercury is



there all during the life of the battery just where it is wanted, and that the method is effective is shown by the following test made by Dr. A. E. Kennelly upon four 300-ampere-hour EDISON cells taken at random from stock:

Weight of zinc before test.....	10,017 grammes
" " " after "	8,567 "
Zinc consumed	1,450 "
Zinc consumption calculated from ampere hours.....	1,444 grammes
Lost by local actiop.....	6 "

The voltage was practically uniform, while the internal resistance decreased steadily during the test.

In the selection of batteries for the operation of signals, you are practically limited to the copper oxide cell, of which the EDISON is the most improved type. It is a question of economics; let us quote you figures.

Ask also for our new BOOK "T. A."

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Orange, N. J.

31 Union Square, New York
304 Wabash Avenue, Chicago
25 Clerkenwell Road, London

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

NEW YORK, MARCH 16, 1906.

The Book Department of TELEGRAPH AGE, always a prominent and carefully conducted feature of this journal, has, in obedience to continually growing demands made upon it, materially increased its facilities of late. The desire 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. These will be of especial aid to buyers inasmuch as they contain brief descriptive references of each volume listed, frequently with full chapter titles.

The Western Union Telegraph Company Fifty Years Old.

This year the Western Union Telegraph Company rounds out fifty years of corporate existence. It has reached its golden jubilee. In no minor strain should the circumstance, so full of happy omen, be heralded. Rather should it be a time of congratulation, an opportunity for an expression of good will and of rejoicing. It is fitting that so auspicious an event should have suitable mention. The details, therefore, of the history of this great corporation, the largest and most powerful telegraph company in the world, the record of its wonderful development and of its achievements are fully recounted elsewhere in this issue. The story, graphic in its presentation, will be read with intense interest in every land the world over, for it unfolds a narrative of accomplishment, frequently executed under the gravest of difficulties, in promoting according to the measure of practical success, the most subtile, ingenious and important of modern inventions.

Telegraphy, although a well-established fact, was nevertheless, comparatively speaking, a new art in 1856, when on April 4 of that year the Western Union Telegraph Company was granted its charter by the State of New York. Prior to that date its general acceptance as a means of communication had been limited, perhaps because facilities were narrow; its constructive progress was slow. Building, however, upon the foundation of its immediate predecessor, the New York and Mississippi Valley Printing Telegraph Company, the merger which resulted in the formation of the Western Union Telegraph Company, brought together disunited, feeble and conflicting interests, welding the same into a single, compact whole. A mighty impulse was imparted to the new relations thus secured, which at once gave a distinct, better defined and more tangible direction to the telegraph and its future in America. It was the beginning of the magnificent structure that has since been reared on this initial proceeding, and which has since caused the North American continent to be covered with a network of wires, and submarine cables to be laid in every sea, for the influences exerted by this great company have been most potent.

It was auspicious that the control of this company was originally vested in the hands of men of strong perceptions, of large mental calibre, having the courage of their convictions, who had absolute faith in the enterprise upon which they had entered. Under skillful management, impetus was gained, weakness developed into strength and the enormous commercial value of telegraphy became more and more apparent. The transmission of executive control through succeeding administrations has uniformly placed strong men in office. This company has been fortunate in this respect, for under whatever vicissitudes of fortune it may have labored at any time in the long period of fifty years, it has, with the practice of indomitable energy, not only been able to overcome all obstacles to progress, but has pressed forward with giant strides, gaining in strength and power and broadening its field of operations. It is a record of growth that stands without parallel.

The fifty years of life of the Western Union Telegraph Company has been productive of such vast results, so intimately associated in promoting the development and advancing the civilization of the country by its progressive methods and ready means of communication afforded, which gave to the newspaper press its opportunity to rise to its present strength in disseminating news and information and to annihilate time and distance, that however much in these busy latter days we have come to regard and accept the ample service rendered as a matter of course, it is well to pause and consider what has led up to

it, its beginning, its growth and full fruition. In this spirit of retrospect and of acknowledgement, the golden jubilee, now at hand, will awaken a very general sense of sympathetic and responsive interest.

Bogus Telegrams Again.

Apropos of our article in the issue of February 16 on the "Misuse of Fac-Simile Telegraph Blanks for Advertising Purposes," an instance comes to our knowledge from an interior town of a western state where a theatrical company notified the populace individually by means of bogus telegrams, advertising by a catchy phrase therein the advent of the show. The method was well calculated, even though it should successfully advertise the coming play, to cast ridicule and contumely upon the telegraph company having a local office, whose envelope and message blank it grossly caricatured. In this instance, like many others of the same kind, the case was aggravated by the fact that these bogus telegrams were delivered by the telegraph company itself, the consent of the manager thereto being gained by the argument that managers elsewhere had consented to make such deliveries. Whether that statement was true or not, common sense ought to have dictated to the manager to resist the impudence of any proposition that would tend to bring discredit upon the company whose best interests he was bound to serve. Furthermore, it should be well-known to any manager who lays claim to intelligence that well-informed managers would not lend themselves and the facilities of their offices to the furtherence of such obviously fraudulent methods however disguised by playful words and expressions. A fraud is a fraud, no matter whether it be a big one or a little one. A telegraph company is organized for the conduct of serious business and is not expected to play the part of a clown in any such buffoonry.

It should also be well-known to every manager as a part of his stock of general information governing the conduct of his office, that the telegraph companies frown upon the practice of sending bogus telegrams and their attornies seek to stamp out such action by legal measures whenever and wherever possible. A bogus telegram, no matter what the intent of its senders, or how close or how remote it bears resemblance to the genuine article, is issued contrary to and in defiance of the law. No explanation or excuse can get around this fact, and the stern suppression of all violations of so just an enactment should find sympathy and active support by managers and others everywhere.

"Tattling Operators."

A man who had once been a telegraph operator in Newport made a curious revelation recently while testifying at the trial of Mr. Hapgood, says the New York Tribune. He admitted having used for pecuniary profit, in more ways than one, information contained in personal messages which he had been called upon in a business capacity to send or receive. A more recent but isolated instance of the same practice has come to light on the Pacific Coast. It is said that a prominent St. Louis brewer disapproved of the attachment which a certain German army officer entertained for his daughter. The two young people were reported to be at Pasadena, Cal., and a despatch from Los Angeles to eastern newspapers declared that the irritated father had wired to the young woman, "Do nothing rash."

The question arises, if such a message was really sent at all, how did its contents become known? The supposed recipient and the officer referred to are represented by the press despatch in question as declining to talk about their plans. At the time when the story first appeared in print the distressed father had not yet reached the coast. It is safe to conclude that not one of the three persons chiefly concerned has confided what must be regarded a family secret to the public. There is an equally strong probability that it was divulged by a domestic or a telegraph operator, either in Pasadena or elsewhere in California. If an operator is responsible for the leak, he may have cherished no intention of levying blackmail or even of securing a cash compensation for the service rendered to local reporters, but he has been guilty of a grave offence all the same.

It is to be feared that a considerable number of employees of telegraph companies fail to realize that they occupy positions of trust. No conscientious bank clerk would feel at liberty to tell an outsider the size of a depositor's balance. His employers would dismiss him instantly if they knew he had done so. The information belongs solely to the depositor and to the bank. In like manner a telegraph message is the exclusive property of the sender and recipient. It is for one of them to reveal its nature if anybody does so, and an operator who betrays either the text or purport of such a communication imitates a person who uses another's property without permission. There is not the slightest reason to believe that the author of the telegram in question was willing to have it published. He would perform a valuable service to the public, therefore, if he would investigate the affair thoroughly enough to discover who the offender is, and take the proper steps to inflict punishment. If a telegraph operator shall be found to be responsible, it should be an easy matter to secure his discharge.

It may not be out of place to recall another recent occurrence which in one respect resembles the apparent breach of trust just committed in California, because there are suggestive points of dissimilarity. A few weeks ago the Arctic explorer Amundsen made a sledge trip from the mouth of the Mackenzie River to the nearest telegraph station in Alaska, and sent from that point to Nansen tidings of his success in achieving the Northwest Passage without harm and of having obtained the magnetic data which he had sought. At Seattle it was necessary to repeat his message, and either the operator who received it over the government cable there or the one who put it on the land wire for transmission over the next section of the route, seems to have felt justified in making the telegram public immediately. The proceeding was technically but perhaps not morally

wrong. It does not appear that either Amundsen or Nansen authorized it, yet there can be no doubt that both of them would have been glad to share the news with the whole civilized world. Had it not been communicated to the press while on its way, it would have been cabled back to America from Europe within twenty-four hours after reaching Sweden. The worst feature of the premature announcement was that it was an invasion of privacy and of law.

[The subject, substantially as it appears in the "Tribune" article, has been given considerable publicity in the press of the country, and because a false conception of the integrity of telegraph operators might result therefrom in the mind of the general public if the matter were allowed to pass unnoticed, we give it attention. Deductions are drawn of the "tattling" qualities of operators that are wholly without warrant, that will not bear the light of investigation, for in no instance have the implied charges been proven; no evidence of guilt is shown. The inuendo gratuitously expressed cannot be sustained, and such careless writing, in effect reflecting upon the character and honor of a large class of conscientious and hardworking body of men, carefully trained in the requirements of their profession, should not go unrebuked. It does not appear that the Newport operator referred to was ever employed by a telegraph company at that place. The case of the St. Louis brewer is almost unworthy of notice. The attempt to fasten a leakage of information upon an innocent operator is begging the question. The publicity attained may have been due to a hundred causes. Most likely the origin may properly be traced to unguarded conversation with some one or more persons connected with the several households concerned in the affair. The probabilities of a leak in a telegraph office are very remote. For, where thousands of messages are being constantly handled, the work of the average operator becomes automatic largely in its performance, no time being allowed or inclination felt even to carefully read over and charge the mind with the contents of important dispatches. The grist in the telegraphic mill is without distinction, The case of the Amundsen telegram having been made public, is clear enough. The explorer made his way to the nearest Alaskan telegraph office on a sled. There, in addition to sending his telegram, he undoubtedly publicly expressed himself regarding the nature of his discovery. This was natural, and it was also natural that an indefatigable newspaper correspondent realizing the importance of the news should at once have telegraphed it to his home paper at Seattle where its publication gave the news world-wide currency. It is time that uncalled for aspersions upon the rectitude of the telegraph operator were stopped. —Editor.]

The Author of the Message, "What Hath God Wrought."

The first telegraph message was sent by a seventeen-year-old girl, Miss Annie Ellsworth, who carried the news to Professor Morse of the passage of the bill by Congress appropriating $30,000 for the construction of a trial line between Baltimore and Washington. It was then that he assured her she should write the first message, and a little more than a year later, at her mother's suggestion, Miss Ellsworth, who was the daughter of the Commissioner of Patents, himself a great friend of Prof. Morse, sent over the wires the words of the Psalmist. "What hath God wrought?" The original message had always been in Miss Ellsworth's keeping, and a copy of it is filed in the archives of the Historical Association of the city of Hartford, Conn. She married Roswell Smith, of Lafayette, Indiana, who was for many years editor of the Century magazine, and died at Montclair, N. J., January 21, 1901, at the age of seventy-three years.

The Age Limit.

An illustration of how the age limit rule adopted by several railroad companies about two years ago, and which is rapidly lapsing into a state of "innocuous desuetude," is regarded by representative railroad men, is shown by an interview with Henry N. Rockwell, who was recently appointed a member of the New York Board of Railroad Commissioners.

When asked if he endorsed the "young man theory," as applied to the rank and file of the service, Commissioner Rockwell said:

"Emphatically no; so far as my observation and experience have gone during forty years of active railroad service, a railroad man—an engineer, conductor, telegrapher, towerman and so on—does not render his best service until he is past forty years of age. His best powers in the way of care and general efficiency remain unimpaired until he is sixty or sixty-five years old, according to the individual. Among several good and sufficient reasons for this, one is that a man at such a period of life is generally settled, has a family and lives methodically. One reason why there are fewer railroad accidents in England than in this country is probably because the age of railroad workers is greater on the average over there. Men of family are generally given the preference, other things being equal, over unmarried applicants for the most responsible operating positions in the service."—The Railroad Employee.

To reach success every project and plan, every nerve and brain cell, every thought and act is brought into subserviency to this one all-absorbing purpose. The ambitious and self-respecting can find happiness in nothing short of success.

Early Telegraphs in Pennsylvania.

A correspondent in Pennsylvania has this to say concerning one of the initial lines of telegraph across the Allegheny mountains:

"Fifty-one years ago, in 1855, a telegraph line consisting of a single wire was built from Philadelphia to Pittsburg by way of Lancaster, Chambersburg, Bedford, Stoyestown and Ligonier. Although the practicability of Prof. Morse's invention has been fully demonstrated, the wise men of the section through which the line passed shook their heads and characterized the work as a piece of tomfoolery. It was freely prophesied that, aside from its doubtful utility, a line could never be maintained across the Allegheny and Laurel Hill mountains. Winter's storms and ice and snow and summer's lightning would soon put an end to this foolishness, they said.

"However, in the face of all these adverse opinions and repeated warnings offered gratuitously by the unanimous vote of the Wayback Club at their regular tri-daily meetings at the cross-roads store, the projectors completed the line and established an office in Stoyestown in the general store of the late John F. Rainey.

"When the line was opened for business Mr. Rainey's brother-in-law and clerk, James S. Zimmerman, now of Pittsburg, was installed as operator, having previously been called to an eastern office and instructed in the new art. This was the first telegraph office opened in Somerset County, Pa., and created a great sensation.

"People came for miles to see this new means of communication and went away doubting. The Wayback Club transferred its meeting place to the telegraph office, which was also the post-office, and listened in openmouthed wonder to the ticking of the instrument.

"People along the line in the mountains were seen gazing intently on the wire in the hope of seeing a message pass, and when nothing could be seen flatly refused to believe that anything had flashed over the wire.

"Messages were then received by the Morse register on tape. One evening a stranger came into the store and while seated behind the stove listened to the ticking of the instrument on the desk in front. He wrote out the message and read it to the assembled crowd. It created consternation. Was this man gifted with supernatural power? He had simply read by sound.

"But in a short time the novelty of the invention wore off and it was accepted as a success."

If the United States military telegraph pension bill becomes law, as is expected, during the present session of Congress, Mr. Crosby J. Ryan, of Detroit, Mich., who is blind as a result of exposure during the Civil War in performing telegraphic duties for Generals McClellan, Williams and others, will receive the benefits of the measure by being pensioned by the National Government.

Telegraphers' Mutual Benefit Association.

From the assessment notice just mailed to the members of the Telegraphers' Mutual Benefit Association we extract the following, which ought to be a strong inducement to members of the craft to affiliate with this leading fraternal insurance association:

"One of the prime features of the administration of telegraph societies is full publicity. In addition to the details of the business for the current year, this association has always published a synopsis of its reports since organization, thus affording to every member as well as to every prospective applicant for membership, a comprehensive view of operations unique in the annals of co-operation. Starting in a small way amid the strain and stress which characterized the period at the close of the Civil War, and passing in early days through epidemics which devasted a large part of the country, it has steadily grown to its present position in the insurance world, after boldly proclaiming more than eighteen years ago, that benefits could not continue to be paid unless members' payments were adequate; while economy in expenses coupled with effectiveness in operation and careful selection of healthy risks meant that the annual cost would be kept to the lowest point.

"This association was one of the first in the field; and the principle of assessment co-operation for protection of the family, which it founded in the telegraph fraternity, has wrought untold good and has been found to be just as safe and enduring as is any other principle.

"If the present membership is desirous that this principle should be carried to a later generation of telegraphers it behooves them to work as did the pioneers of the movement, by pointing out to the eligible persons of their acquaintance that this is now the oldest fraternal co-operative insurance association in the country; that in the thirty-eight years of its existence, during which it disbursed nearly $1,200,000, it never has had an overdue claim; that its expenses are nominal, its annual charge to each member the lowest consistent with security; that the field for the work was never greater than now, and that this association occupies its chosen field, having the protection of the home of the telegraph and telephone employee as the only purpose for which it exists."

Every man is the architect of his own fortune—the arbiter of his own destiny—in the most emphatic sense. Therefore every young man should select a career in life and hold steadfastly and unwaveringly to the accomplishment of his purpose. It is not the genius who makes the world stand amazed at his achievements. It is the earnest, faithful, conscientious worker who forges his way upward and onward, and wins the laurels of noble achievement. Success is won by deserving it—by grasping the golden key of opportunity and unlocking the door of splendid possibilities.

More Patents for Mr. Barclay.

Mr. John C. Barclay, assistant general manager and electrical engineer of the Western Union Telegraph Company, New York, has recently been granted several patents, covering improvements on his printing telegraph system, and, we understand, a large number of companion patents are pending. Three patents were issued to Mr. Barclay on February 6, one of which covers a keyboard telegraph transmitter; another relates to the printing mechanism of the receiving apparatus and the third has for its subject a relay used in connection with the transmitting apparatus. The keyboard transmitter is intended primarily for use in connection with Mr. Barclay's page-printing telegraph printer, says the Electrical World, although it is not limited to this particular application.

The essential parts in combination consist of several adjustable stops or circuit-controlling devices, adjustably mounted on a movable drum, and arranged to be adjusted in position according to the character to be transmitted. The stops are arranged and set into position by the manipulation of the keys on the keyboard, which is practically similar to that of the ordinary typewriter. The stops so set represent the dots, dashes and spaces comprising the characters of the alphabet or code, the next stop in the sequence of operations being the actual transmission of the characters to the line. One of the problems in developing instruments of this class has been to devise means to secure uniform spacing between characters. The letter "E," for instance, in the Morse code is represented by one dot, while the character for a paragraph is four dashes, and that for the numeral 6 is six dots. If unit time were allotted per character it is obvious that the spacing between characters would vary inversely as their length. It is necessary in instruments of this kind to keep the space between characters uniform.

Mr. Barclay accomplishes this result in a very ingenious manner, and this is one of the objects of the present invention, others being, certain and rapid operation, ease of operation, ease of inspection and keeping in order, and relative economy. The stops may be set either by electromechanical means or by mechanical means. The drawings show the apparatus operated by electromagnets, these being controlled by the depression of the key levers by hand. For the protection of the instrument the transmitter is not connected directly to the line, but operates a relay which repeats the signals into the main circuit. The second patent covers an improvement in the printing mechanism of the page-printing receiving apparatus used by Mr. Barclay in the printing system. The type characters are arranged on the surface of a wheel, like a ticker type wheel, which is revolved until the desired character is brought into printing position; the wheel is then moved forward into contact with the paper, thus printing the characters in sequence.

It was found that when such printing mechanism was operated at high speed some characters missed position. The object of Mr. Barclay's invention is to prevent this missing of characters and secure certainty and reliability of action. The relay described in the third patent is designed to control a large number of electrical circuits and is particularly intended for use in Mr. Barclay's printing telegraph system. It may be either of the polar or the neutral type. The instrument represented in the drawing has an extension of the armature lever, at the outer end of which is a recess which engages a pin on a rocker or drum placed vertically upon the base of the instrument. The body of the drum is of insulating material, but through it, longitudinally, are arranged contact pins which close the various circuits by coming into contact with contact fingers on one side or the other as the armature lever vibrates. The contact fingers, representing circuit terminals, are arranged in two vertical rows parallel to the axis of the drum, so that when the armature lever is on one side one row of contact fingers is connected in circuit and with the armature on the other side the other row is in service. The pins project through the rocker from back to front. The back contacts constitute the other terminals of the circuits. In a general way the drum and its functions are similar to those of the electric railway car controller on a small scale.

A Unique Plan of Laying Wires.

The use of ferrets to string the wires in conduits had been a joke for years with the men in charge of underground construction. In this connection Superintendent Cline of the Bell Telephone Company at Terre Haute, Ind., recently said:

"As with a good many other simple methods, we refused to try ferrets because it sounded like a good newspaper story and was impractical. But a test has been made and we know it is the best way to put the lead wire through the ducts. A sort of harness is put on the little animal and attached to it is a strong but light fish line. At the next opening of the duct a piece of meat was hung, and the animal tugged away at his cable of fish line to get to the meat.

"In Terre Haute we will try another plan. We will turn a rat loose in the duct and let the ferret go after the rodent. At the opening the rat will run into the trap or bag. We could not let the ferrets have the meat for as soon as they get something in their stomach they go on a strike. We shall not let them have the rats until they have done a day's job. The old method of using wooden rods for pushing the wires through the duct took the labor of several men, and a ferret will do all that three men can do."

COL. ROBERT C. CLOWRY.

Seventh president of the Western Union Telegraph Company, now in office, whose term began March 12, 1902.

FIFTIETH ANNIVERSARY OF THE WESTERN UNION TELEGRAPH COMPANY.

FROM every point of view the nineteenth century witnessed the most stupendous awakening of the human mind as shown in every field of ethical thought and practical endeavor. New intellectual prerogatives seemed to be in the ascendant, and there came the most remarkable advancement within the scope of science and of every form of invention calculated to promote and develop civilization, the world has ever known. There was a sudden breaking away from the past; its traditions and prejudices were swept one side and the emergence to a broader and more sublime knowledge gained by the solution of hidden mysteries and of the possibilities of the future dawned almost as from the operation of a magic wand.

Within the period named came the invention of the telegraph. The story of its evolution has been told, and to the master mind that directed it into being we delight to render homage and honor. But of the great agencies that have since given the telegraph direction and power, and hence vastly increased possibilities of usefulness beyond anything at first conceived, the story in its details is not so familiar. We accept the fact of the telegraph company, but how it came into corporate existence and developed in potentiality of purpose we are not so well informed. The story, then, told in sequential form of an organization whose purpose it is to provide facilities for the dissemination of knowledge, of news and of commercial needs broadcast throughout the country and the world, must in the very nature of the case be of profound interest.

To gather up and consolidate minor companies, comparatively local in themselves, and shape them into a single, compact, connecting, homogeneous whole, imparting life and financial strength in place of weakness and insecurity; reaching out with giant strides, ever in the van, and gridironing the country with wires until its service penetrates all sections, and with its cable systems rendering connection close with foreign lands, is briefly the history of the fifty years of life of the Western Union Telegraph Company. The moneyed resources and executive force that have been able to bring about this vast accomplishment, reflects in the best manner the genius and indomitable spirit of American enterprise.

The controlling influences now at work in further extending and developing this great property have never been exceeded in intelligence and in practical capacity. Probably no other administration has ever had so thorough and complete a grasp of details as that now in power. This is abundantly demonstrated in the closely directed supervision of the system constantly maintained in every part and the resultant raising of the standard in equipment and service everywhere manifest.

While the exigencies of the times, the growing strength of various forms of competition, renders modern telegraphic management more difficult than that of former years, because demands are larger, more exacting and because more careful economies must be practiced, it will nevertheless be freely admitted that the general efficiency of the Western Union Telegraph Company has never before reached such a high plane of excellence.

The current year of 1906, as already stated, marks the fiftieth anniversary of the founding of the Western Union Telegraph Company. By act of the Legislature of the State of New York, passed April 4, 1856, the company was granted its original charter. Prior to that date and between the years 1851 and 1856, the predecessor company was known as the New York and Mississippi Valley Printing Telegraph Company. The change to the name of the Western Union was to shorten a long title and to adopt one that would indicate the union of the Western lines, which had just been consummated, into one compact system.

Mr. Abijah R. Brewer, the secretary of the Western Union Telegraph Company and its historian, whose mind is a veritable treasure house of important facts concerning the telegraph in general and his own company in particular, has delved deeply into the history of the Western Union company. What he has to say in this respect of the growth and development of his company forms a most interesting chapter in telegraphic history, and is told with a detailed reference to facts, which shows careful research, establishing him as an authority in such matters probably without equal. We are indebted to Mr. Brewer for much of our information, and in what follows we quote copiously from his writings.

To not a few persons at the present day it has appeared strange that the telegraph was not at first established through the agency of a single company; but it is obvious that such a course could not be followed, and that the owners of the patents, under which the various lines of telegraph were then operated, after years of disappointment, pursued the natural, and, in fact, the only course open to them, of selling to such purchasers as offered, and on the best terms they could obtain. The number of companies which grew up in this manner was afterwards multiplied by unfortunate quarrels and differences among those interested in the patents, until, by 1851, over fifty different telegraph companies were in operation in different parts of the United States.

Most of the companies were licensed by the owners of the Morse patents; a few used the devices of Alexander Bain, which were afterwards adjudged to infringe the Morse, and one or two used another and very attractive instrument, which had just been brought to completion, and which was not an infringement of any patent. This was the printing telegraph, invented by Royal E. House, of Vermont, which seemed to possess a feature of superiority over the Morse in that the messages it received were printed in plain Roman letters, ready for delivery to the persons addressed, while the Morse messages were received in dots and dashes, which had to be translated and written out by the operators before they could be delivered.

Lines to operate the House instruments were built

between New York City and Boston, and between New York City and Philadelphia prior to 1850, and, at about that time, Judge Samuel L. Selden, of Rochester, N. Y., secured an agency for the extension of the House system through the rest of the United States. When, in arranging for the construction of his New York City to Buffalo line, Judge Selden reached the city of Rochester, he applied to his friends in that place and vicinity for funds to extend the line westward. This solicitation for assistance from the people of Rochester led to the organization in that place of a company which afterwards became the Western Union Telegraph Company, and from that place it was managed for fifteen years.

HENRY S. POTTER.

President of the New York and Mississippi Valley Printing Telegraph Company, the immediate predecessor of the Western Union Telegraph Company, and for a short time its first president, whose term of office extended from April 2, 1851, to July 30, 1856

ORGANIZATION OF THE WESTERN UNION TELEGRAPH COMPANY.

The undertaking upon which the projectors of the new company entered was the extension throughout the West of the House telegraph system. To carry on the work they organized the "New York and Mississippi Valley Printing Telegraph Company" (afterwards the Western Union), with a proposed capital of $360,000, to build a line of two wires from Buffalo to St. Louis, Mo., as a nucleus for further extensions. The plan thus indicated failed, in consequence of the inadequacy of subscriptions to stock, and the promoters were consequently compelled to modify their plans and make special concessions to attract subscriptions. These concessions brought a few subscriptions, but only enough to build a line of one wire over a part of the route originally selected from Buffalo to Louisville, and amended articles of association were therefore filed, covering the route and reducing the stock to $170,000. This was the original capital of the Western Union Telegraph Company.

If the promoters were unfortunate in not being able to carry out their undertaking on the scale first outlined, they were fortunate in the following respects:

Their license contained a provision designed to encourage growth and extensions, instead of the customary restrictions limiting the line to a single

HIRAM SIBLEY.

Second president of the Western Union Telegraph Company, whose term of office extended from July 30, 1856, to July 26, 1865.

route; telegraph construction had passed the worst phases of the ruinous experimental stage and assumed a fairly practical form by the time the work of the new company began. They were also fortunate in the composition of the board of directors, which contained a working majority of men of force of character and of constancy of purpose. The care exercised by these directors in drawing the specifications for the construction of the line, and their close supervision of the work of the builders, resulted in the erection of a really superior line, which they operated with close economy, yet, at the end of three years, the company had run into debt and the money invested in the line was believed to be lost by most of the people of Rochester. Wire, instruments and other material had been purchased

on credit, and the following extract from the minutes of the executive committee, June 26, 1852, shows that even this resource was precarious:

"Resolved, That the secretary be authorized to order or purchase two instruments for this line of J. B. Richards if he will furnish them after an explanation of the condition of the line and the financial affairs of the company."

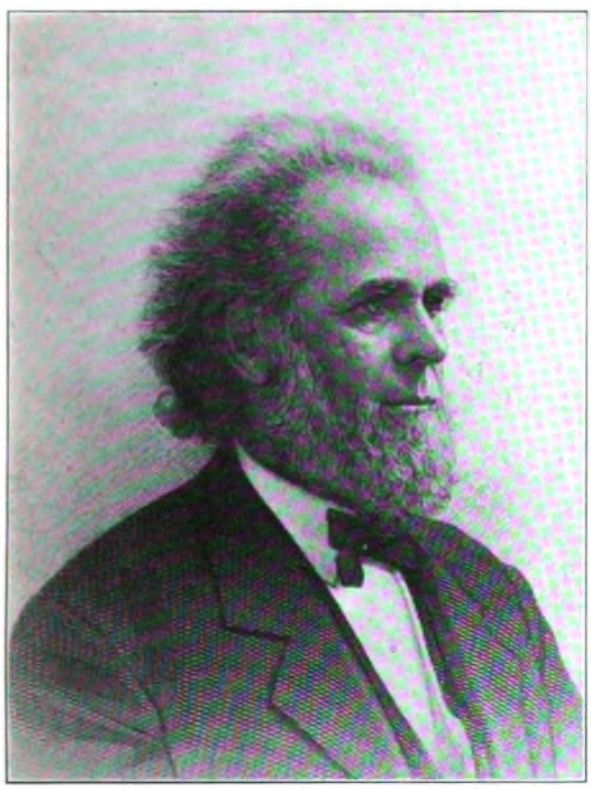
CONDITION OF THE TELEGRAPH IN THE WEST IN 1854.

Although about fifteen thousand dollars in debt the new company was in better condition than most of the other telegraph companies in the West. Two rival systems, consisting of thirteen different companies all using Morse patents, were in operation in the five states north of the Ohio River, and were waging a three-cornered fight with the new company and with each other. All the disadvantages of multiplied and inharmonious management, such as contradictory rules and methods of doing business, doubling of rates when messages passed from one company to another, each company collecting its full rates, and an inefficient and unreliable service, were, of course, the inevitable results.

The conditions thus described impoverished the western companies and made it impossible for them to pay the cost of replacing the poor and badly planted poles, the three-strand iron wires, and the worthless insulation of early experimental construction. By 1854 the lines of two of the thirteen companies had been sold for debt; another company had assessed its stockholders to the point of confiscation; the stock of some of the others could be bought for a few cents on the dollar, and many side lines or connecting lines had failed and their poles and wires were abandoned and allowed to go to decay.[2] Only one company, that between Pittsburg and Louisville, carrying the St. Louis and New Orleans traffic to and from the East, was yielding a proper return to its stockholders.

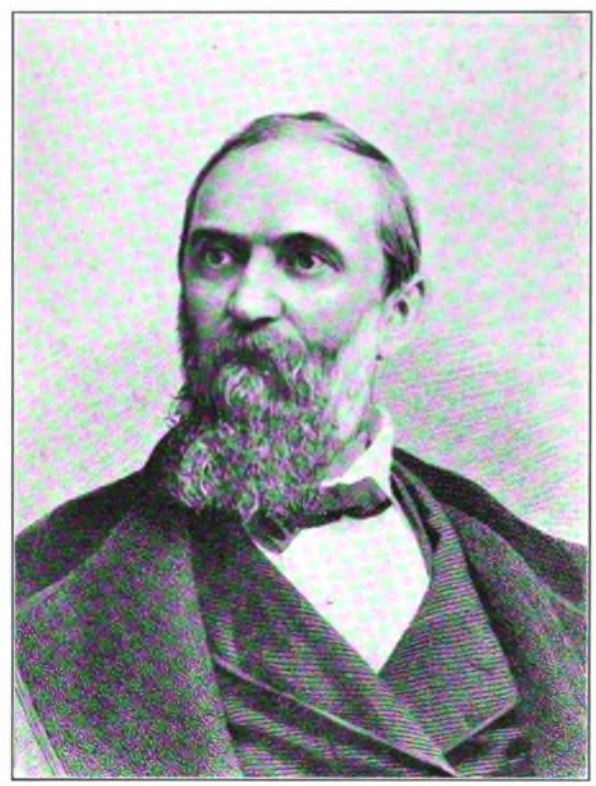
THE FIRST IMPORTANT EXTENSION.

On the other hand, the resolute energy of the New York and Mississippi Valley Printing Company had begun to make an impression. That company had succeeded in arranging for an extension of its line to Chicago by making a contract with the railroad companies which provided that they should build the line and take pay therefor in telegraph stock, and it had also made a contract of alliance with the purchasers of one of the bankrupt Morse



JEPTHA H. WADE

Third President of the Western Union Telegraph Company, whose term of office extended from July 26, 1865, to July 10, 1867.



WILLIAM ORTON

Fourth President of the Western Union Telegraph Company, whose term of office extended from July 10, 1867, to April 22, 1878

[2] Abstract from deposition of J. J. Speed, 1856.

The line from Cleveland to Zanesville never paid more than the expense for keeping it up and it was subsequently in part or wholly abandoned.

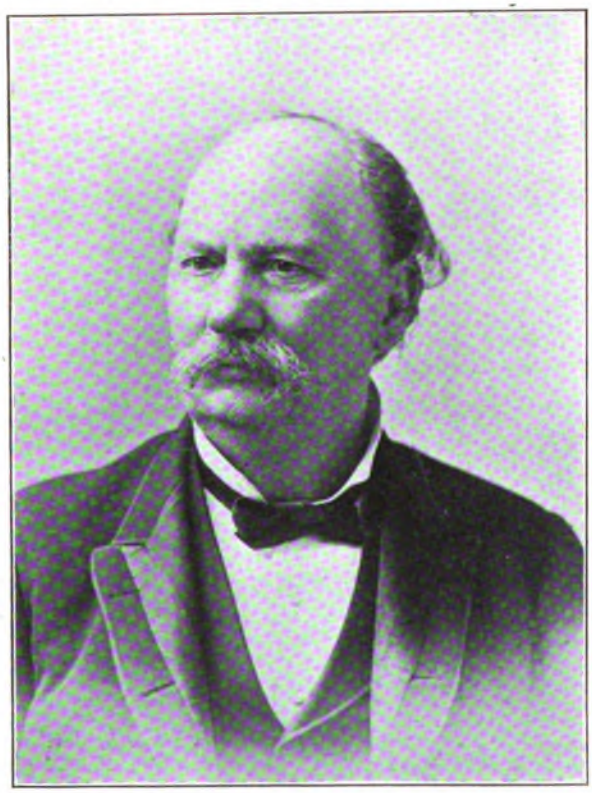
The line from Cincinnati to St. Louis, via Terre Haute, not paying expenses, he (the builder) let it go down and abandoned it.

I sold the patent for the line from Milwaukee to Green Bay to S. W. Hotchkiss. He built the line, worked it a short time, and abandoned it.

The line from Cleveland to Newcastle never paid enough to keep it in repair or pay for working.

The line from Wheeling to Uhrichsville was kept up a short time and abandoned for want of business.

lines. At this stage, the principal owners of some of the other companies became discouraged and resolved to sell their telegraph properties if they could do so, and invest their money more conservatively. Unable to find any other purchaser, and as a last resort, they went to Rochester and offered their interests to the New York and Mississippi Valley Company. These interests embraced all unsold Morse patent rights in seven western states, the control of one large telegraph company, a third interest in another, and full control of four smaller organizations. The principal owner of these properties refused to take in payment the stock of the New York and Mississippi Valley Company, which afterwards became very valuable, and demanded cash,[4] and the transaction was carried through only



NORVIN GREEN

Fifth President of the Western Union Telegraph Company, whose term of office extended from April 22, 1878, to February 13, 1893.

by the issue and sale of bonds of that company. At the same time, and as a part of the same transaction, the company purchased the property and lines of the bankrupt Morse company mentioned as its first ally, and the House telegraph patents for seven states, paying for both in its stock, which was increased for that purpose.

In reference to the purchases described, and immediately after their conclusion, the company issued the following circular:

TELEGRAPH CONSOLIDATION.

UNION OF HOUSE, MORSE, SPEED AND WADE LINES.

The New York and Mississippi Valley Printing Telegraph Company, by purchase, has the undisputed and exclusive control of all patents pertaining to telegraphing, in the states of Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and the territory of Minnesota, including connections with Pittsburg and St. Louis.

By purchases, leases and business arrangements, the said company has also the entire control of all the lines known as the Wade lines, several of those known as the Speed lines, and the Lake Erie line extending from Buffalo to Detroit and from Cleveland to Pittsburg, besides its own line connecting the cities of Buffalo, Cleveland, Columbus, Dayton, Cincinnati, Lexington, Frankfort and Louisville, which is also to be extended along the railroad from Cleveland to Chicago, through Sandusky and Toledo, and which the railroad companies have agreed to construct.

It is well known that heretofore great confusion and imperfection has existed in the telegraph lines in the West on account of which much of the business of the public has been badly done and the telegraph stock-

GEN. THOMAS T. ECKERT

Sixth President of the Western Union Telegraph Company, whose term of office extended from February 13, 1893, to March 12, 1902.

holders have been poorly paid. This has been caused by the various and conflicting claims to the Morse patent, by questions as to its validity, by competition between the Morse and House systems, and by the short, disconnected and poorly-built lines, acting without concert and without responsibility beyond their respective limits.

The validity of these patents is now settled and this is the first time since the invention of the electric telegraph that the different patents and interests and lines in the extensive territory above-mentioned could be sufficiently got under one control to enable the proprietors to meet the wants of the public.

Since these various and perplexing misunderstandings are now at an end, it is to be hoped that the confusion heretofore prevailing in telegraph business may soon give way to harmony and the telegraph be made to answer better than ever before the purpose for which it was designed.

[4] Personal narrative of J. H. Wade.

Railroad companies and others wishing to arrange for lines of telegraph, or the right to use the patents thereto, will address the principal agent of the company, J. H. Wade, Esq., at Columbus, Ohio, or either of the undersigned, at Rochester, N. Y.

HENRY S. POTTER, President.
JOSEPH MEDBERY, Vice-President.
FREEMAN CLARKE,
HIRAM SIBLEY,
GEORGE H. MUMFORD, Ex. Com.
SAM'L L. SELDEN,
ISAAC R. ELWOOD, Secretary.

It is impossible, in this sketch, to do full justice to the courage and foresight which inspired the operations last described. It may be well, however, to sum up the results of these efforts by stating that through a series of contracts the following advantages were secured:

1. Release from the obligation to use the House patents exclusively, and freedom to avail of the greater simplicity and economy of the Morse devices.

2. Protection from rivalry and the exclusive ownership and control of all the valid telegraph patent rights, which soon became a source of revenue through sales of licenses to railroad companies and others.

3. The opportunity to effect economies in the operation of seven different companies.

4. Entrance into Pittsburg, St. Louis and other important places.

On the other hand, the risks assumed appeared to be great, as times were very hard, and the company then, for the first time, became subject to fixed charges, not only for interest upon the bonds issued, but also for rental upon the outstanding stock of some of the acquired companies. When, to these statements, is added the further one that there was no market for the bonds, and that the directors and their friends were compelled to take them, discounting their personal notes to pay for them, it will be seen they took an heroic step and practically pledged their fortunes to the success of the venture.

NAME OF THE WESTERN UNION TELEGRAPH COMPANY.

Soon after the conclusion of the contracts described, one by one, lease by lease, by purchase, or by exchange of stock, the remaining companies in the West came into the new company's system; their imperfect lines were rebuilt according to improved standards of construction, their wires were multiplied, numerous extensions were made in all directions, the service was improved, and, in short, order and system took the place of confusion. Soon afterwards, in 1856, by act of the New York Legislature, the company's name was changed from the New York and Mississippi Valley Printing Telegraph Company, to the shorter and more popular title of "Western Union Telegraph Company," indicating the union of the western lines into one compact system.

The work of rebuilding and improving the old lines thus acquired and of making new extensions consumed all of the earnings for the next few years, but the directors held together loyally in a fixed purpose to build up the property and make it valuable. Notwithstanding these efforts, it was nearly seven years after the organization was completed before the stockholders received any return from their investments. In December, 1857, the company paid its first dividend.

The early growth of the company has thus far been described at some length, because, in the period covered, were laid the foundations of its ultimate success. For the next four years its operations were mainly confined to construction along the fast-increasing railroads and elsewhere in its territory, and to extensions into Missouri and Kansas. During these four years, and even prior thereto, consolidations, similar to those described, had been going on in other sections, and the telegraph interests of the country had gradually merged into six systems working together in friendly alliance. These systems were substantially as follows:

1. The American Telegraph Company, covering the Atlantic and some of the Gulf States;
2. The Western Union Telegraph Company, covering the states north of the Ohio River, and parts of Iowa, Minnesota, Missouri and Kansas;
3. The New York, Albany and Buffalo Electro-Magnetic Telegraph Company, covering New York State;
4. The Atlantic and Ohio Telegraph Company, covering Pennsylvania;
5. The Illinois and Mississippi Telegraph Company, covering parts of Illinois, Iowa and Missouri;
6. The New Orleans and Ohio Telegraph Company, covering the southern Mississippi valley and the Southwest.

In addition to these six companies, sundry companies had sprung into existence on the Pacific Coast, and many other small companies, operated in alliance with the six companies in their respective territories.

THE EXTENSION TO THE PACIFIC.

The next important extension was made in 1861. For several years there had been a growing demand for the construction of a line across the western plains to connect the eastern system of lines with those of the Pacific Coast. A quicker method of communication than that furnished by mails by the way of the Isthmus of Panama was not only a necessity to the general government in dealing with its Pacific stations, but it was also urgently required by the commercial interests in both sections. The difficulties in the way of a telegraph line were regarded by many as almost insuperable. It was alleged, for instance, that the Indians would tear down the wires as fast as they were put up, or that the poles would be swept away by the irresistible movements of the immense herds of buffalo then roaming over the plains. To men not swayed by speculative considerations such as these, other serious, practical obstacles presented themselves. Among these were such difficulties as those of procuring and transporting poles and of repairing the lines when

injured; while not the least of the uncertainties was the amount of business to be depended upon after the line was up. It was therefore not believed that the line could be built, or afterward maintained, without substantial aid from the Government, and when Congress pared down the appropriation to $40,000 per year, for the preferential use of the line, and limited it to ten years' duration, the disappointment of the telegraph companies was very great. To such an extent was this the case that, at the convention of the six companies, held in August, 1860, the delegates voted that the act passed by Congress was "so objectionable in principle and detail that this convention declines to recommend its adoption by the associated companies forming the North American Telegraph Confederation." The Western Union delegates to the convention, however, took a different view, and wanted to have the Pacific line built. They accordingly offered and carried through a resolution providing that nothing in the preceding resolution was to be so construed as to prohibit any company, either alone or in conjunction with others, from bidding for the work. When the bids were opened, the Western Union Company, represented by Hiram Sibley, was found to be the only bidder and to Sibley the contract was therefore awarded. As a preliminary to its work the Western Union acquired from C. M. Stebbins and others a majority of the stock of the Missouri and Western Telegraph Company, and the St. Louis and Missouri River Telegraph Company, of which last-named company Robert C. Clowry, now president and general manager of the Western Union Telegraph Company, was superintendent and secretary. For the purpose of building the eastern section of the line the Pacific Telegraph Company was at once organized. It engaged a great number of ox teams to transport material over the plains; it contracted with Brigham Young, of Salt Lake City, for poles and labor, and it sent a representative to California who arranged for and effected a consolidation of the California companies, which were to build the western section. Notwithstanding the discouragements arising from the refusal of many to participate in the work by taking stock in the new enterprise, the Pacific Company and the California Company pushed the work with such vigor that the line was completed on March 15, 1861, a little over four months from the time it was begun, and in time to be of incalculable service to the Government at Washington and to the general public during the Civil War.

FINAL CONSOLIDATION OF ALL THE PRINCIPAL COMPANIES INTO THE WESTERN UNION TELEGRAPH COMPANY.

During the period covered by these transactions, and as a result of the extensions and improvements mentioned, as well as of the growth in population, the business of the company rapidly increased. No records have been preserved of the revenues for the first two years (1852-1853), but the gross revenues for the next year (1854) were $72,755. In nine years from that time, that is, in 1863, the revenues had increased thirteen-fold. This increase made an outlet to the eastern seaboard cities, which should be entirely under the control of the company, an obvious necessity and a matter of vital importance. To secure this end the company acquired, by purchase and by exchange of stock, the lines of the New York, Albany and Buffalo and the Atlantic and Ohio Telegraph companies, which gave it the desired entrance into both New York City and Philadelphia and full control of the intervening territory. In like manner were also acquired the lines of the Pacific Telegraph Company and the lines of the California State Telegraph Company. After these consolidations had been effected the lines owned by or under the control of the Western Union Company extended from New York City to the Pacific Coast, covering substantially all the territory west of New York City and north of the Ohio River and Fort Smith, Ark., and Santa Fe, New Mexico. The remainder of the United States was assigned to the American Telegraph Company, which, by similar methods, had acquired the lines of the New Orleans and Ohio (or Southwestern) and other companies.

In opposition to these two great combinations, and coincident with the expiration of the Morse patents, there had sprung into existence a number of organizations, which, in 1864, were combined under the name of the United States Telegraph Company. The advantages possessed by one company under one management over two companies, one of them managed at Rochester, and one at New York City, were too apparent to be ignored, and, as in previous instances where similar conditions had obtained, they led inevitably to the consolidation, which took place in 1866, and which was concluded by an exchange of Western Union stock for the stock of the two other organizations.

Thus, in fifteen years from its organization, the Western Union Company rose from the position of a local company controlling about 550 miles of wire to that of a national system controlling over 75,000 miles of wire. Although much of this growth was the result of the acquisition of other companies, much also resulted from extensions made by the company itself. Such were the conditions shown by the first annual report, published in October previous to the consolidations of 1866. That report states that 8,593 miles of wire had been purchased and put into use during the preceding sixteen months, while a much smaller amount, namely, 3,800 miles, had been acquired during the same time by consolidation. Similar conditions are shown by an analysis of the property after the consolidations of 1866, which gathered in the American and United States systems and brought the consolidated company's wire up to 75,000 miles, but even of this amount nearly two-thirds had belonged to the Western Union before the consolidation.

Of the properties which have been mentioned as having been acquired, some were very profitable, others were not immediately so, but all acquisitions and extensions were of benefit to the public, and

they were essential to the improvement of the service and made possible reductions in rates on a scale which could hardly have been carried out under the old conditions. How great such reductions have been may be seen by an examination of the following table.

Comparative statement of rates for ten words from New York City and from Chicago to the principal cities of the United States:

	From New York City.		From Chicago.	
	1865.	1906.	1865.	1906.
Atlanta, Ga.	$3.25	.50	$2.10	.40
Boston, Mass.	.65	.25	2.20	.50
Chicago, Ill.	2.05	.40		
Columbus, Ohio	2.90	.40	1.20	.25
Concord, N. H.	1.00	.25	2.20	.50
Denver, Colo.	7.00	.75	5.55	.60
Galveston, Texas....	5.50	.75	3.25	.75
Hartford, Ct.	.50	.25	2.10	.50
Jackson, Miss.....	3.05	.50	2.25	.50
Little Rock, Ark.....	4.00	.50	1.95	.50
Memphis, Tenn.	2.85	.40	1.65	.40
Minneapolis, Minn...	3.40	.50	1.50	.25
New Orleans, La....	3.25	.60	2.70	.50
New York, N. Y.....			2.05	.40
Omaha, Neb.	4.45	.50	3.55	.35
Portland, Me.	.90	.25	2.35	.50
Portland, Ore.	10.20	1.00	8.05	.75
Richmond, Va.	2.05	.35	2.25	.50
St. Louis, Mo.	2.55	.40	1.00	.25
San Francisco, Cal..	7.45	1.00	5.00	.75
Santa Fe, N. M.....	10.50	.75	9.05	.75
Tallahassee, Fla.	3.50	.60	2.85	.60
Topeka, Kan.	3.75	.60	1.75	.40
Washington, D. C...	.75	.25	1.80	.40

The policy which inspired most of the reductions shown was set forth in the annual reports from time to time as follows:

"The adoption of the new system will make an average reduction of the present rates of about fifteen per cent. These reductions do not result from competition, but are made in spite of it." Annual Report, 1869.

"During the past year two important modifications have been made in the tariffs." (These modifications were both extensive reductions.) Annual Report, 1873.

"It continues to be the policy of the Company to make conservative reductions of rates." Annual Report, 1884.

"No rates have been increased, and all changes in tariff rates have been in the line of reduction." Annual Report, 1891.

After the consolidations of 1866, the general office was moved from Rochester to New York City, and the Rochester directors withdrew, one by one, from the management, which thus passed into new hands.

The commanding position reached by the Western Union in 1866 has been steadily maintained, and its later as well as its earlier history is a record of continual growth. The 75,000 miles of wire which represented the plant in 1866 have been multiplied fifteen-fold to over one million miles; yet this statement represents only a part of the company's development. The whole plant, including poles, wires, cross-arms, and insulators, has, of necessity, been reconstructed several times according to the newest and most improved standards, and similarly the most modern and efficient batteries, office machinery and appliances have been put in the place of the earlier and cruder forms. Large and substantial poles have replaced the slender ones first put up, glass insulators screwed fast to steel pins have replaced the smooth glass cemented on wooden pins, as well as the mixed and experimental insulation of the early days, and copper wire, of great conductivity and endurance, is fast replacing the perishable iron wire. In many of the principal cities, and at great cost, the wires have been laid underground.

In the batteries which furnish the motive power for the operation of the lines, equal improvements have been made, and dynamo and storage batteries have, to a large extent, been substituted for chemical batteries. The latter, besides being less effective than the new batteries, were maintained only at great expense for space and care, as they consisted of hundreds and often of thousands of heavy and expensive jars of constantly deteriorating acids and metals.

The instruments and apparatus employed for handling and forwarding messages represent many and great advances, the first of which was brought about by the evolution of Morse's invention into the simple and practical sounder, which has displaced alike the Morse recorder and the beautiful printing instrument which the company introduced into the West. The Morse operator no longer translates and slowly copies from a long slip of recorder paper, but, reading entirely by the sound of the instrument, he writes or typewrites the message simultaneously with its reception over the wire, and by this improved method greatly diminishes the liability to error and delay.

Duplex telegraphy was the next great step. The duplex was invented in 1871-2 by the president of another company,* who, failing in his efforts to sell his invention to his own company, found a purchaser in the Western Union. By this system two messages are sent over the same wire at the same time, one in each direction.

It was soon seen that the principle upon which the duplex was founded admitted of extension, and arrangements were made with Thomas A. Edison to develop any latent possibilities in that direction. Mr. Edison effectually demonstrated the correctness of the view indicated by producing the "Quadruplex," by which four messages are sent over the same wire at the same time, two in one direction and two in the other. Thousands of the wires are now duplexed or quadruplexed by means of one or the other of these two devices, and an immense mileage of "phantom," but nevertheless practicable, circuits has thus been created without cost, except for the additional instruments required.

The latest important advance in the operating department is the adoption of the Barclay printing telegraph system, the invention of John C. Barclay, assistant general manager and electrical engineer of the company, which prints received messages on a typewriter.

This invention is the most important that has been made in the field of practical telegraphy. Four Chicago circuits and one Buffalo circuit have been equipped with the system, and other

* Franklin Telegraph Company.

important wires are to be installed as rapidly as apparatus can be supplied. The bulk of the Chicago-New York business is being exchanged by this system. Many minor inventions and improvements can not be mentioned for want of space. Altogether they represent the best that human ingenuity has supplied to aid the telegraph in its work, and embody the achievements of Morse, House, Stearns, Phelps, Edison, Barclay and many others. Further, and perhaps as great, advances may be expected in the future, as many ingenious minds are now engaged in this great field, and their creations, when reduced to practical efficiency, can not fail to be welcomed and employed.

In opposing, in 1845, the bill for the extension of the Government line, one of the members of Congress* said that he had rejoiced at the invention of the telegraph and hoped to see it extended to all the principal cities of the United States, but he "wanted it to be called for by the commerce of the country and to pay its own expenses." So the telegraph has been extended through corporate agency in compliance with the demands of the people to every place in the United States that has commerce enough to justify it. This has been done, not only without creating a tax upon the non-users of the telegraph, but in such a manner as to return interest to the owners of the property. For that reason the stock of the company has become a standard and popular investment, and more than ten thousand persons comprise the list of its owners.

Such, as indicated in this story, were some of the steps by which the telegraph was extended until the "blue sign" may be seen in nearly every village in the land; such were some of the measures by which value and stability were given to the property, and at the same time, an important industry, scarcely thought of sixty years ago, created and developed, until now it employs more than thirty thousand persons.

The following table shows the expansion of the telegraph service as exemplified in the exhibit of the Western Union Telegraph Company's business during the past fifty years.

*Thos. H. Benton, U. S. Senator, February 28, 1845.

THE WESTERN UNION TELEGRAPH COMPANY

Milcage of Lines Operated, Number of Offices, Number of Messages Sent, Receipts, Expenses, Etc., for Each Year since 1866.

Year.	Miles of Poles and Cables.	Miles of Wire.	Offices.	Messages.	Receipts.	Expenses.	Net Revenue.	Average Tolls per Message.	Average Cost to Co. of Message.
1866....	37,380	75,686	2,250	.....					
1867....	46,270	85,291	2,565	5,879,282	$6,568,925.36	$3,944,005.63	$2,624,919.73	.....	....
1868....	50,183	97,594	3,219	6,404,595	7,004,560.19	4,362,849.32	2,641,710.87	104.7	63.4
1869....	52,099	104,584	3,607	7,034,933	7,316,918.30	4,568,116.85	2,748,801.45	89.3	54.2
1870....	54,109	112,191	3,972	9,157,646	7,138,737.96	4,910,772.42	2,227,965.54	75.5	51.2
1871....	56,032	121,151	4,606	10,646,077	7,637,448.85	5,104,787.19	2,532,661.66	69.5	45.7
1872....	62,033	137,190	5,237	12,444,409	8,457,095.77	5,666,863.16	2,790,232.61	66.2	43.8
1873....	65,757	154,472	5,710	14,456,832	9,333,018.51	6,575,055.82	2,757,962.69	62.5	43.4
1874....	71,585	175,735	6,188	16,329,256	9,262,653.98	6,755,733.83	2,506,920.15	54.9	39.5
1875....	72,833	179,496	6,565	17,153,710	9,564,574.60	6,335,414.77	3,229,157.83	54.	35.2
1876....	73,532	183,832	7,072	18,720,567	10,034,983.66	6,635,473.69	3,399,509.97	50.9	33.5
1877....	76,955	194,323	7,500	21,158,941	9,812,352.61	6,672,224.94	3,140,127.67	43.6	29.8
1878....	81,002	206,202	8,014	23,918,804	9,861,355.23	6,309,812.53	3,551,542.70	38.9	25.
1879....	82,987	211,566	8,534	25,070,106	10,060,640.46	6,160,200.37	4,800,440.09	38.6	25.2
1880....	85,645	233,534	9,077	29,215,509	12,782,894.53	6,948,956.74	5,833,937.79	38.5	25.4
1881....	110,340	327,171	10,737	32,500,000	14,393,543.85	8,485,264.13	5,908,279.72	38.4	25.6
1882....	131,000	374,368	12,068	38,842,247	17,114,165.92	9,906,095.92	7,118,070.00	38.2	25.8
1883....	144,204	432,726	12,917	41,181,177	19,454,902.98	11,794,553.40	7,660,349.58	38.	26.
1884....	145,037	450,571	13,761	42,076,226	19,632,939.60	13,022,503.90	6,610,435.70	36.5	25.2
1885....	147,500	462,283	14,184	42,006,583	17,706,833.71	12,005,909.58	5,700,924.13	32.1	24.9
1886....	151,832	489,607	15,142	43,289,807	16,298,038.55	12,378,783.42	3,919,855.13	31.3	23.4
1887....	156,814	524,641	15,658	47,394,530	17,191,909.95	13,154,628.54	4,037,281.41	30.4	23.
1888....	171,375	616,248	17,241	51,463,955	19,711,164.12	14,640,592.18	5,070,571.94	31.2	23.2
1889....	178,754	647,697	18,470	54,108,326	20,783,194.07	14,565,152.61	6,218,041.46	31.2	22.4
1890....	183,917	678,997	19,382	55,878,762	22,387,028.91	15,074,303.81	7,312,725.10	32.4	22.7
1891....	187,981	715,591	20,098	59,148,343	23,034,326.59	16,428,741.84	6,605,584.75	32.5	23.2
1892....	180,576	739,105	20,700	62,387,298	23,706,404.72	16,307,857.10	7,398,547.62	31.6	22.3
1893....	180,936	769,201	21,078	66,501,858	24,978,442.96	17,482,405.68	7,496,037.28	31.2	22.7
1894....	190,303	790,792	21,100	58,632,237	21,852,655.09	16,060,170.21	5,792,484.88	30.5	23.3
1895....	189,714	802,651	21,360	58,307,315	22,218,019.18	16,076,620.97	6,141,389.21	30.7	23.3
1896....	189,018	826,929	21,725	58,760,444	22,612,736.28	16,714,756.10	5,897,980.18	30.9	24.
1897....	190,614	841,002	21,769	58,151,684	22,638,859.16	16,906,656.03	5,732,203.13	30.5	24.3
1898....	189,847	874,420	22,210	62,173,749	23,915,732.78	17,825,581.52	6,090,151.26	30.1	24.7
1899....	189,856	904,633	22,285	61,308,157	23,954,312.05	18,085,579.19	5,868,732.86	30.8	25.1
1900....	192,705	933,153	22,900	63,167,783	24,758,569.55	18,503,205.87	6,165,363.68	30.8	25.1
1901....	193,589	972,766	23,238	65,057,040	26,354,150.85	19,668,902.68	6,685,248.17	30.9	25.1
1902....	196,115	1,029,984	23,567	69,374,883	28,073,095.10	20,780,766.21	7,292,328.89	31.	25.7
1903....	196,517	1,089,212	23,120	*66,700,866	29,167,686.80	20,953,215.07	8,214,471.73	31.4	25.6
1904....	199,350	1,155,405	23,458	*67,903,973	29,249,390.44	21,361,915.46	7,887,474.98	31.7	26.1
1905....	200,224	1,184,557	23,814	*67,477,320	29,033,635.04	21,845,570.32	7,188,064.72	31.6	27.3

*Not including messages sent over leased wires or under railroad contracts.

Dinner to Charles Shirley.

Charles Shirley, for many years manager of the operating department of the Postal Telegraph-Cable Company, New York, was given a complimentary dinner at the Hotel St. George, Brooklyn, on Saturday evening, March 3, tendered by his friends in the Postal company in honor of Mr. Shirley's promotion to the position of superintendent of the Metropolitan district. It was a most delightful affair, an occasion probably without equal in kind in the annals of telegraphy. As a testimonial of respect and esteem nothing could have been finer. The dinner was emphatically what may be termed a family reunion, for only those connected with the Postal company were present. Of these, two hundred and eighty assembled, including numerous officials, employees of the operating room, both ladies and gentlemen, chiefs, branch office managers and others, a representative Postal gathering in the best sense. The dinner was served at half past seven o'clock. The menu card, a four-leaf folder, bore the emblem "73," and was further embellished by a fine picture of Mr. Shirley. At the close of the repast, Mr. Thomas E. Fleming, who acted as toastmaster, after some preliminary remarks, announced the first toast: "The Postal Telegraph-Cable Company—Clarence H. Mackay, President," which was drunk standing.

The first speaker was Wilbur Eastlake, who spoke on "187," that being the number on Broadway of the former and first main office of the company. As may be imagined, his theme was largely that of retrospect. Mr. Joseph F. Ahearn spoke on "253," the present home of the company, and his remarks had more of a modern flavor. The subject of "The Branches" was discussed by John Costelloe, and Daniel L. Russell responded to the "Press and Broker Service." Miss E. T. McGuire was very felicitious in speaking for her associates, "The Lady Operators." Mr. Fleming, the toastmaster, next made "A Few Remarks," and after that it only remained for Mr. Shirley to speak regarding "Himself." He was characteristically modest and brief in what he had to say, and received an ovation from those present which gave evidence of an amount of sympathy and affection for the individual seldom witnessed.

Mr. William H. Baker, who was one of the speakers, expressed his personal pleasure at being present, his remarks being listened to with close attention. He said that the sentiment prevailing at this dinner, the hearty good wishes expressed, and the pledges of loyal support of Mr. Shirley in his new position was in itself sufficient reward for those responsible for his selection. Mr. Baker declared that the Postal always endeavored to make promotion from among its own men and that therefore every ambitious employee should strive to fit himself or herself for higher positions, so that he or she may be ready to take advantage of opportunities that may offer either in or out of the telegraph service.

Mr. Fleming in his remarks said, that judging from the previous speakers, Mr. Shirley was possessed of all the virtues not having one single, decent, respectable vice to take with him into his new chair. He then went on to say why it was that Mr. Shirley was so popular, stating that in his opinion the qualities for a manager of a large operating department were fairness to all employees, willingness to hear both sides of any complaint, loyalty to his staff as well as to his employers, and at all times stimulating his staff to an ambition for better work. In closing he said that all present would agree that the guest had the characteristics which he wished inculcated in every member of his staff, that of obedience, submission, discipline and courage, which Samuel Smiles said are the characteristics which make a man.

Interspersed throughout the speeches there was an interesting musical programme given by solo singers, together with the recitations of a humorist.

Among those present were: Charles Shirley, the guest of the evening; William H. Baker, vice-president and general manager of the company; George H. Usher, superintendent; Theo. L. Cuyler, Jr., assistant treasurer; Thomas E. Fleming, special agent; Edward Reynolds, auditor; John Costelloe, superintendent of the commercial news department; E. S. Butterfield, cashier; F. F. Norton, manager of the main office; D. F. Mallon, assistant night manager; F. E. McKiernan, chief operator; A. E. Chandler, superintendent of the district service; F. E. d'Humy, division electrician; J. F. Needham, district electrician, and more than two hundred and fifty others, including about sixty ladies, members of the Postal force, and wives of some of those present.

Many letters and telegrams of regret were received from a number who were prevented from attending by the inclemency of the weather.

Old Time Telegraphers of the Northwest.

Progress seems to be making in the project of organizing in the Far West a telegraphers' society, to be known as "The Old Time Telegraphers of the Pacific Northwest." The movement appears to have its headquarters at Spokane, Wash., where a recent banquet was held in furtherance of the undertaking, which was attended by about seventy-five telegraphers, commercial and railroad. A larger meeting will soon be held at Spokane to further advance the idea, and representative telegraphers from all parts of the Pacific northwest, from Helena, Butte, Salt Lake, Portland, Seattle, Tacoma and other cities will be present and endeavor to permanently bring about the organization named. The following committee was appointed at Spokane for the purpose of arranging for this meeting and the organization: Colonel W. H. Plummer, Thomas P. McKinney, Al. W. Neimeyer, A. D. Campbell, F. E. Michaels and D. Fletcher.

LETTERS FROM OUR CORRESPONDENTS.

[Advertising will be accepted to appear in this department at the rate of five cents a word, estimating nine words to the line, announcements to be enclosed with a border and printed under the name of the place of the advertiser. The special local value attached to advertising of this character will be apparent. Our agents are authorized to solicit advertisements for these columns, and further information on this subject may be obtained on application.

The current information of any office will, if carefully chronicled, furnish a welcome digest of news that will be read with pleasure and satisfaction by thousands, and this limit should constitute the legitimate contents of all letters. And we wish that our correspondents would avoid the too frequent habit, at all times a bad one, of abbreviating words in writing. This is a peculiarity among telegraphers, we know, but what may be plain to the writer, and for local interpretation, is usually a mystery to the editor, and is apt to lead to error in the printed statement.]

BOSTON, WESTERN UNION.

A number of improvements have been made in the city branches during the past year, the latest being the removal of the office in the woolen district. The old office at A street was found quite inadequate for the amount of traffic handled and it was moved to 263 Summer street to new and elegant quarters. The office is fitted with new furnishings of quartered oak and cherry. A new switchboard was also installed and a New York wire and extra city loops added to the facilities. The office is in charge of Miss Redfern with Mr. Furtardo as assistant. This office is without doubt one of the finest in point of furnishings in the city.

Miss Murray, of the cashier's department, has been transferred to the Old State House office, vice B. F. Terry, who goes to the main office.

James Shannon, one of our solicitors, had a son born to him on the day of the Longworth-Roosevelt wedding. It has been named Nicholas Longworth Shannon.

Chief Operator Capt. Thomas F. Clark, post-commander-in-chief of the National Legion of Spanish War Veterans, attended a convention of the order held at New Bedford, February 22-23, and was shown the sights by Manager Lewis, of that city.

Miss Keane has been promoted from the assorting desk to the position of operator; Hiram Jones, check boy, likewise becomes an operator.

James Carney, from New York, is a recent appointee.

Fred Dixon has resigned to go with The Associated Press; also M. J. Bell, who goes to Bangor.

CHICAGO, WESTERN UNION.

On February 10, a delightful surprise party was given Assistant Chief Operator C. H. Finley. He was presented with a beautiful cut glass bottle and tumblers, for which he made a pleasant little speech of thanks. Those present were: Mrs. Paddock, Mr. Edward Wells, Miss May Gallagher, Frank Donaldson, Mr. and Mrs. E. G. Scheckler, Mr. and Mrs. Benjamin P. Well, Dr. and Mrs. Cunningham, Mr. and Mrs. Edward T. Ames, Mrs. Ida Palmer, Mr. James E. Bell, Mr. Patch, Mrs. Pollock, Misses Harriet and Elizabeth Pretzel, Miss Odea, Mr. John Dayhoff, Mr. Frank Crittenten, and Mr. Theron T. Childs.

Operator Eller, an old-timer, formerly of the Milwaukee Board of Trade office, is a recent arrival.

The operating staff are pleased and gratified to hear that Edward Hearn, formerly an operator here, has recently been appointed traffic chief in the Postal main office, this city.

PHILADELPHIA, WESTERN UNION.

The branch office, 100 South Tenth street, has been moved to the north side of Chestnut street, near Tenth street. The change is most gratifying to Manager Harry Hehl, who is said to have the finest and most up-to-date branch office in the city.

The building at Tenth and Chestnut streets, where this company had its main office for many years, is to be torn down and a more modern building erected in its place.

H. I. Powell and A. W. Lerne have left us and gone to New York, while J. G. Stanley has also resigned, to go to Newark, N. J.

Great preparations are under way for the annual progressive euchre, banquet and ball which the Aid Society will give on April 8. It gives promise of eclipsing by far all of their former affair.s

Harry Given, a well-known operator, now in business at Stealton, Pa., paid us his respects recently.

NEW YORK.

WESTERN UNION TELEGRAPH COMPANY

EXECUTIVE OFFICES.

Another daughter has been born to Mr. George J. Gould, a vice-president of the company. Mr. Gould's children now number four daughters and three sons.

Mr. G. H. Fearons, general attorney of the company, who, accompanied by his wife, went to Hot Springs, Va., a short time ago, for a brief vacation, is back again at his desk, much refreshed by the trip.

Mr. A. E. Sink, formerly manager of the operating department, has been appointed to a position in the executive offices of the company.

The office at Jamestown, N. Y., having had the necessary apparatus installed, will hereafter be a repeating station between New York and Chicago.

Of the forty-eight annual and semi-annual tariff books issued up to the present time by the company, Mr. William Holmes, the superintendent of tariffs, has produced forty-seven of the number.

Mr. C. F. Ames, superintendent at Boston, Mass., was a recent visitor. Mrs. Ames accompanied her husband.

The headquarters of superintendent E. M. Mulford will be removed from the seventh to the third floor of the building within a few days. A

house-warming to celebrate the occasion will take place on Saturday, March 17.

Mr. S. H. Strudwick of the cable station at North Sydney, Nova Scotia, is in the city on a visit.

IN THE OPERATING DEPARTMENT

Mr. Robert Morton of the quadruplex department is acting chief clerk to chief operator, T. A. McCammon.

Mrs. C. M. Cunningham of the Commercial News department, one of the best lady telegraph operators in the country, has recently undergone a successful operation for appendicitis.

Civic Lodge, F. and A. M., of which Mr. E. C. Watkins of the general operating department is the master, gave its first annual entertainment and ball at the Harlem Casino on Thursday evening, March 1. About 2,000 people were present, including many of the Masons from this office, and the affair was a most pronounced success, socially and financially.

Mr. C. H. Lawrence, of the quadruplex department, nights, has been appointed Southern traffic chief, nights, vice Mr. C. H. S. Small, deceased.

Mr. L. D. Grace has been assigned to the quadruplex department, nights.

Miss Nellie Turner has resumed duty in the Eastern division, after an absence of several months in a branch office.

Benjamin F. Cogger, formerly of the quadruplex department, and a well-known old-time telegrapher, died at his late residence, at Roseville, N. J., on March 1.

Miss Wiley, late of the Boston main office, and Miss Robertson from Glen Cove, L.I., are registered among the new arrivals, and have been assigned to the Eastern division.

"Senator" W. L. Ives, the dean of the Eastern division, who has been ill, has just returned after a few weeks' stay in Syracuse. The trip up-State has done the Senator a lot of good, and he hopes to resume active duty shortly on his regular circuit which he has worked continuously for the past twenty-three years.

Mrs. W. T. Rogers, nee Miss May Enright, formerly of this department, wife of Southwestern Wire Chief Rogers, died at her late residence in Brooklyn on March 7. A large number of friends from this office attended the funeral.

Mr. W. B. Purcell, Western traffic chief and recording secretary of the aid society, is rapidly convalescing from his recent illness.

The sympathy of many friends is extended to Mr. J. J. Phelan, of the telegraph department of the United States Steel Co., in the death of his wife, formerly Miss Maggie Lestrange of this department.

Mr. M. F. O'Neill has been called to Baltimore to attend the funeral of his father, who died suddenly in that city.

Wednesday evening, March 7, Amaranth Council, Royal Arcanum, made up largely of members of this force, had a fishing party at Tilyou Pond, Steeplechase, Coney Island. Mr. E. E. Brannin, Jersey traffic chief, proved the victorious angler of the evening, he having succeeded in landing four good sized codfish.

POSTAL TELEGRAPH-CABLE COMPANY.

EXECUTIVE OFFICES.

At the annual meeting of the stockholders of the Postal Telegraph-Cable Company held February 27, the following named directors were re-elected:

C. H. Mackay, W. H. Baker, E. C. Bradley, Wm. C. Van Horne, A. B. Chandler, C. R. Hosmer, G. Crocker, G. G. Ward, E. C. Platt, J. W. Ellsworth, G. Clapperton and C. C. Adams.

At the meeting of the directors held March 6, the following named officers were elected and appointed:

President, Clarence H. Mackay; vice-president and general manager, William H. Baker; second vice-president, Edgar C. Bradley; third vice-president, George G. Ward; fourth vice-president, Charles C. Adams; assistant general manager and assistant secretary, Charles P. Bruch; treasurer, Edward C. Platt; assistant treasurer, Theodore L. Cuyler, Jr.; secretary, John O. Stevens; auditor, Edward Reynolds; general counsel, William W. Cook; electrical engineer, Francis W. Jones; associate electrical engineer, John F. Skirrow; traffic manager, Minor M. Davis; superintendent of tariffs, Isaac Smith; superintendent of supplies, Walter D. Francis; superintendent complaints and claims department, John Doran; special agent, Thomas E. Fleming; superintendent leased wire department, Henry F. Hawkins; superintendent commercial news department, John Costelloe; patent attorney and expert, William B. Vansize.

Mr. Edward Reynolds, auditor of the company, has left for a business trip that will take him as far as the Pacific Coast. He is accompanied by his wife.

Colonel A. B. Chandler, chairman of the board of directors, accompanied by his wife, left the city on March 7 for a visit to Camden, S. C.

Mr. Minor M. Davis, traffic manager, has returned from his extended trip to the Pacific Coast, whither he went in the interests of the service.

Mr. J. Z. Hayes, chief operator of the company at Detroit, Mich., was a recent visitor.

Mr. E. J. Nally, general superintendent at Chicago, was a recent visitor.

IN THE OPERATING DEPARTMENT

On March 1, when Mr. F. F. Norton, our new manager, took charge of the operating department, he found a beautiful floral horseshoe on his desk, a gift contributed by the force. A card was attached to the piece expressing best wishes and success to Mr. Norton in his new official capacity.

Mr. Robert C. Murray, Jr., general wire chief, Western Union Telegraph Company, Philadelphia, together with one of his assistants, Mr. O. M. Pennypacker, paid a visit to the operating room a few days since. Although their stay was a brief one, they were very agreeably entertained by Messrs. Whalen and Mallon.

Miss L. Moss is still absent owing to illness, and has gone to Lakewood, N. J., for her health.

J. T. Ewing, formerly Western traffic chief, is now located in the electrical engineer's office, where he will be in charge of the phantoplex system.

W. W. Dier has been transferred to the 944 Broadway office.

J. Twigg has been transferred to the Fifth avenue and Forty-second street office.

T. F. McGinty has been added to the night force and H. A. Yoell to the all-night force.

George Sayres has been appointed assistant quadruplex chief.

J. Ward has been added to the service department.

J. B. Rex is again in charge of the Western traffic, days.

Miss Anna Crawford has been added to the operating force.

OTHER NEW YORK NEWS

The spring dinner of the Magnetic Club will take place at the Hotel Astor, Forty-fourth street and Broadway, on the night of April 17. The large banquet hall has been engaged for the occasion, as a large attendance is expected.

Mr. Leo Miller of the Postal Telegraph-Cable Company, at Philadelphia, Pa., who has just completed a trip around the world that has taken ten months, was a recent New York visitor.

Telephoned Telegrams.

The custom of delivering messages over the telephone does not always work out to the satisfaction of those concerned. Telegrams addressed to commercial salesmen, for instance, and sent in care of their customers, have in many cases been annoying, particularly when the messages related to business between the salesman and said customer. The telegraph companies have recently found it necessary to instruct their managers that in cases where parties authorize telegrams to be telephoned to or from them, it is necessary to secure a written order to that effect, and when a telegram is so telephoned ascertain first, who is at the receiving telephone, and after the telegram has been telephoned mark the time upon the copy, the name of the party receiving at the telephone, and also the name of the telegraph employee who telephones the message. A copy of the telegram telephoned must be subsequently delivered or mailed to the addresee, plainly marked "duplicate of telegram telephoned."

Success in life is the sublime purpose, the universally coveted goal, to the attainment of which every man and woman bend their best energies and their most unremitting efforts.

The Boston Telegraphers Mutual Aid Society.

The Telegraphers' Mutual Aid Society of Boston held its annual meeting in that city on March 4. The reports of the several officers showed the association to be in splendid financial condition. There were two deaths during the past year and about $600 was paid out by the association to sick members.

An election of officers resulted as follows: Thomas F. Clark, president; C. A. McManus, vice-president; William H. Sullivan, treasurer; William J. Mahoney, secretary; William J. Mangan, chairman of the relief committee, and Edward C. Donahue, sergeant-at-arms.

THOMAS F. CLARK.
President of the Telegraphers' Mutual Aid Society, Boston.

The new president, Thomas F. Clark, was formerly the treasurer of the association, and is one of its charter members. He is the chief operator of the Western Union Telegraph Company at Boston. He possesses a wide acquaintance, has attractive personal qualities, executive ability, and his selection as presiding officer of the Boston society may be regarded as a most fortunate one.

John A. McNichol, the New Postal Manager at Philadelphia.

John A. McNichol, whose appointment as manager of the Postal Telegraph-Cable Company at Philadelphia, succeeding Charles E. Bagley, promoted to be assistant superintendent at New York, as noticed in the March 1 issue of TELEGRAPH AGE, is a native of the Quaker City, where he was born May 11, 1864. He entered the telegraph business in 1876, beginning his career at twelve years of age as a district messenger boy. Subsequently he found employment with the American Rapid Telegraph Company at Washington, D. C., his term of service being but from December, 1881, to May, 1882, thence going to Pittsburg in the same interests. From Pittsburg, Mr. McNicol went to New

York, where for a period of about three years he was employed first by the American Rapid and afterwards by the Bankers' and Merchants' telegraph companies. In the spring of 1885 he again went to Washington. This time as an employee of the Western Union Telegraph Company. Soon thereafter he returned to Philadelphia, where for a while he again served the Bankers' and Merchants' company, but after its merger with the Postal, became identified with the latter, an association he has since maintained. On October 1, 1889, Mr. McNichol was appointed all-night chief, and on February 1, 1894, was made all-night manager, a position he continued to hold until advanced to the full managership of the office, as already stated. Mr. McNichol has shown himself to be a man of intelligence and capacity. He has a ready grasp of telegraphic interests and needs, and his business methods have been painstaking and thorough. To these qualities he owes his promotion.

Mr. Hesketh and the Quadruplex.

Editor of TELEGRAPH AGE:

I was much interested in reading in the AGE of February 16 the report of Electrical Engineer Hesketh, of the Queensland Postal service, and his assertion that he had only seen one quadruplex working good, and that only 250 miles long. He evidently did not pass through our town, or we could have shown him one working from here to Los Angeles, 510 miles long; another to Albuquerque, New Mexico, 401 miles, all on a 300-lb. copper wire. The length of circuit, Los Angeles to Chicago, 2,265 miles, the polar side working through direct point repeaters, the common side working together, the common side being a circuit of 1,510 miles with polar duplex north of Albuquerque to Denver, Colo. These quads are worked four-sided daily, and the signals on the common side are every bit as firm and solid as those on the polar side. As an instance, in case of emergency west, we are obliged to put the fast broker leased wire at times on the common side, 510 miles, where stock quotations are sent as rapidly as the operator can send them, without a kick of any sort from either end. That I consider a hard test for any quadruplex, the broker circuit being 1,510 miles in length (Denver to Los Angeles). They work equally well, in rain or sunshine, and we have never had to abandon the common side since this office was opened.

W. E. PEIRCE.

Ashfork, Ariz., March 3.

Protection Against High-Tension Electric Wires.

Proper protection against high-tension electric wires where they cross the telegraph wires of railroad companies is a problem recently presented the state railway department of Michigan. The Commonwealth Power Company, which gets its electricity from dams in the southern part of Michigan, is erecting a line of wires from Jackson to Lansing, and it plans to cross the Michigan Central tracks twice, at Rives Junction and a few miles south of Lansing. The wires will carry about 40,000 volts and the railroad men have not restrained their imagination in describing what would happen should a break in the wires occur at a point where they cross the telegraph wires. Any operator on the line would be in danger of instant death, and any number of stations where the wires enter might be consumed by fire.

The railroad department acknowledges the danger in the crossing of the two sets of wires, and is considering plans that the Commonwealth Power Company has submitted for cradles to support the wires in case any break occurred. The problem is not simple from the fact that such cradles must be cumbersome and furnish opportunities for sleet and ice to pull down both wires and poles. Iron poles were suggested by the railroad companies, but to these the power company objects on the ground that they would be attractive marks for lightning. Further conferences are to be held.

The railroads object to the placing of wires underground because of the possible interference with their own electrical systems and the possible danger from connections established by moisture.

The development of great water powers in Michigan and the transmission of the current long distances is likely to make the protection from the high-tension wires a matter of legislation.

Telegraph Operators as Consumptives.

An English authority who has given the subject of consumption among telegraphers of that country serious consideration says:

"Everyone knows that the operator reads better with his ears than with his eyes. He carries out an essentially mental operation by using the nerves of hearing. This faculty is consequently highly developed in his case. In the ordinary work of reading twenty words a minute the telegraph operator must distinguish 150 alternate strokes or intervals, and when there is a rush of work this figure can go as high as 450. There is also the work of transforming the sounds into visible symbols, or writing, which implies another mental process. And whereas the normal amount of varied sensitory impulses per minute is 120, the operator has to accomplish 150 to 450. Without taking extreme cases into consideration, it may be said that the sense of hearing in a telegraph operator is two and a half times more powerful than in an ordinary individual. Again, in telegraphy, the continuity of the nervous stimulation, the monotony of sounds and the fixity of attention are further causes of exhaustion. It is found also that during forced work the operator's breathing is affected, his heart's action precipitated and his brain congested.

"As a result of these phenomena it is noticed that a general decline of the organism follows, ending in tuberculosis. According to a well

known authority, the death rate among men for tuberculosis is 13.8; that of telegraph operators is 46.6, exceeding by 13.5 the mortality among moulders.

"And what is true of tuberculosis applies to other affections of the respiratory organs. The general death rate for the latter is 3.5, but it rises to 18.4 among telegraph operators between fifteen and twenty-five years of age, to 23.1 between twenty-five and thirty-five years of age, instead of 4.9, and to 12, instead of 5.3, between the ages of thirty-five and forty-five. From forty-five years and upward it declines, being 4.3, instead of 5.3; but this diminution is very delusive, seeing that it is due to the elimination of the weak members who have died off in the preceding years. It becomes more marked with increasing age. Between fifty-five and sixty it stands at 0.5, instead of 5.4, and above sixty-five at 0.4, instead of 8.2."

The Phantoplex.

The development of the Phantoplex, invented by Francis W. Jones, electrical engineer of the Postal Telegraph-Cable Company of New York, and which was described in detail in our issue of October 1, 1905, is apparently advancing at a rapid rate, and in every case the system is said to be giving highly satisfactory results. It is said there are some twenty circuits in operation in various parts of the country east of the Rocky Mountains, furnishing an aggregate of over three thousand and two hundred miles of phantom wire, and there are nearly as many more circuits covering a larger mileage of wire that are nearly ready for use.

We are informed that during the recent sleet storms in the Mississippi and Ohio valleys, and also in Virginia, that it was found possible to forward messages via the phantoplex system through the wrecked wires, when they could not be operated by the Morse system.

Mr. Jones states that while the system has far surpassed his expectations in the results that have been attained, that time alone will demonstrate the extent to which the present system of telegraph wires, including their underground, and aerial cables can have the phantoplex system successfully applied to them. But from the manner in which the phantoplex circuits that have already been put in operation are working, the outlook is extremely favorable, and must result eventually in a considerable saving in wires.

Hamilton, Ont.

(Communicated.)

Hamilton is essentially an industrial centre, and along this line her growth during the past ten or twelve years has been extraordinary, in fact, so much so, as to be almost phenomenal. The year 1903 saw the establishment of the Hamilton Steel and Iron Company's blast furnace, a few years after followed the erection of their steel mill; also in the same year the completion of the Toronto, Hamilton and Buffalo Railway. In 1905 came the Westinghouse Air-brake Company. In 1902 the International Harvester Company established their branch here, while 1903 saw the organization of the Canadian Westinghouse Company, Limited, which, if not the largest, is one of the most up-to-date factories on the North American continent. The Frost Wire Fence Company established here about this time, a branch of a Cleveland firm, also the Pittsburgh Steel Company, the Canadian Steel and Wire Company, a branch of a Pittsburgh concern; the Crucible Steel Company; also the Ellis Manufacturing Company, from Pittsburg, and during the year last past the Canadian Drawn Steel Company, and the Union Drawn Steel Company, from Beaver Falls, Pa. Other concerns locating here are the Baynes Carriage Company, from Buffalo, N. Y., F. W. Bird and Son, from East Walpole, Mass., and the Otis-Fensom Elevator Works, with headquarters in New York and Chicago. These are some of the many that are coming from outside points, and nearly all of our older factories have doubled their capacity within the last year or two. Special mention may be made of Sawyer, Massey Company, the Norton Manufacturing Company, and other foundries. The Hamilton Bridge Works Company have more than trebled their capacity. In fact, Hamilton may be said to be, from an industrial point of view, in an exceedingly prosperous condition.

Centrally located is the Great North Western Telegraph office, the oldest, as well as the most popular telegraph company of Canada. The company operates nearly eleven hundred exclusive offices, and communication can be had with upwards of 49,000 places in Canada, the United States and Mexico.

The Generating and Distribution of Music by Means of Alternators.

The Cahill telharmonic system which is illustrated and described in the Electrical World of March 10, is declared to be, says that paper, a new-born electrical art. Dr. Thaddeus Cahill, of Holyoke, Mass., is the inventor. Mr. Cahill has given to the world a realization of one of the most fascinating among Bellamy's dreams in "Looking Backward." Beautiful music is today being produced in a dingy shop in Holyoke, from a group of alternating-current dynamos —directly produced from the dynamos, without intervention of tinkling cymbal or of sounding brass, or of twanging string. And the music may be heard wherever a wire can be stretched. The telephone may be said to have been delivered of its first-born, for it is through a telephone that this music is hereafter to be heard —but in tones loud enough to fill the greatest auditoriums. A new field is also opened to the composer, who may deal with the familiar qualities of sound and with others never heard before. A new field likewise is opened to the performer, who may interpret with a delicacy of control never possible heretofore on any known instrument. Future Paderewskis sitting in New York may be heard in ten thousand places miles apart and in each place the original effect is heard. In each place music is produced not reproduced. Hence a new field is open to the inventor, able to provide the means by which one artist or one orchestral group is multiplied into ten thousand.

John Gavey on the English Underground Telegraph, Etc.

John Gavey, who is president of the British Institute of Electrical Engineers, and engineer-in-chief of the British telegraph system, in a recent speech before the telegraph engineers of that country stated that "the great underground line from London to Glasgow, commenced under the aegis of Sir William Preece, had been completed, and on or after April 1 they all hoped that that line would be at work from end to end. In the course of the present year they would finish an underground line from London eastward to Chatham, and would make good progress with one westward from London to Reading. They might be rather proud of this great work. There was nothing equal to it in the whole world. It was only recently that he had been approached by representatives of the great American companies, who were desirous of obtaining such information as was available on the subject. Another line of progress was, he said, the completion of the great telegraph switch for providing telegraphic inter-communication throughout the metropolitan area. It had been on the initiation of Sir John Lamb that the switch was designed, and it is one of the most up-to-date pieces of telegraphic apparatus that had been introduced anywhere. There appears, he also went on to remark, to be little field for introducing new telegraphic inventions in America, American inventors themselves complaining that their opportunities in their own country were very limited, and that Great Britain was much more ready to give new ideas a fair trial. He observed that it had been said from time to time that a Government monopoly tended to stifle invention. He thought that this was a very good counterblast to a statement of that sort.

Official Diagrams, Etc., of the Postal Company.

The new volume entitled "Official Diagrams of the Postal Telegraph-Cable Company's Apparatus and Rules Governing the Construction and Repair of Lines," published by TELEGRAPH AGE under the official sanction of the Postal company, is a book that should find its way into the possession of every telegrapher. A glance at its contents will reveal at once its intrinsic value from a telegraphic standpoint. In it will be found the Postal rules governing the construction and repair of telegraph lines, rules which may be regarded of general interest and of very wide observance in their application. The question of the use of standard tools is fully considered, as well as those of submarine, underground and aerial cable splices, and of single wire joints. Under the general head of Rules for Wiring Offices and Cable Boxes, the subjects of the terminal office, intermediate offices, submarine and underground cables, aerial cables, call circuits and call boxes, leased wire offices, branch offices, miscellaneous, are fully given. Then come rules for the care of motors and generators, explanation of and rules for the care of the Callaud battery, rules for the care of the Leclanche battery and resistance coils, following which is the table of size and insulation of wire cable for interior use, and that of wire gauges. The full-page diagrams, over one hundred in number, appearing in the volume, are absolutely correct, having been made from the official blue prints.

The price of this work, according to special arrangement made with the Postal company, has been placed at the low price of fifty cents, in order that there may be no restrictions placed upon its sale. This includes the postage. The book is $7 \times 4\frac{1}{2}$ inches in size, has a flexible cloth cover, and may be readily carried in the coat pocket.

Address orders, accompanied by the cash, preferably in Postal or Express money orders, to J. B. Taltavall, TELEGRAPH AGE, 253 Broadway, New York.

The Vibroplex

In order to afford buyers of the Vibroplex, the most perfect telegraphic transmitter extant, an opportunity to deal conveniently with their nearest home agent, the following authorized representatives are named for their special benefit:

Philadelphia, Pa.—D. Good, West. Union Tel. Co.
Pittsburg, Pa.—F. J. McKenna, West. Union Tel. Co.

Mr. J. M. Faulkner, for many years manager at Middletown, N. Y., has been granted three months' leave of absence, and is taking a trip through the pine regions of the South for a much-needed and well-earned rest.

[Advertising will be accepted to appear in this columr at the rate of three cents a word, estimating nine words to the line.]

Rubber Telegraph Key Knobs.

Price fifteen cents, reduced from twenty-five cents. 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. Remit in one or two-cent stamps and address.

J. B. Taltavali, TELEGRAPH AGE, 253 Broadway, New York.

A Valuable Book on Testing.

We are in frequent receipt of letters from correspondents wishing to ascertain the names of a book that will give detailed information on testing by voltmeter, ammeter, etc. We are pleased to announce that a new book just placed on the market, entitled "Electrical Instruments and Testing," by N. H. Schneider, price $1, covers the subject of testing thoroughly. It contains 110 pages and over 100 illustrations and tables. Because the book is low in price does not invalidate its claim to the best of its kind dealing with testing subjects, some of which are as follows:

The simple galvanometer; deflections not proportional to current; ampere turns; selection of size of wire for coil; tangents; the tangent galvanometer; influence of the earth on a galvanometer; the astatic galvanometer; compensating magnet.

Sensibility of galvanometer; figure of merit or constant; the Thompson reflecting galvanometer; forms of the D'Arsonval reflecting galvanometer; ballistic galvanometers.

Rheostats; resistance wires and their composition; laboratory resistance slab; shunts; condensers; keys; the reversing key; the Rymer-Jones key; commutator; the Kempe discharge key; the standard cell; Clark cell; Weston cell.

The voltmeter; the series ammeter; the shunt ammeter; types of instruments; sensibility; duplex instruments; potential indicators; millivolt and milliampere; multipliers; hot wire instruments; shunts; the wattmeter; Thomson inclined coil instrument; Queen instruments; Keystone instruments; G. E. potential indicator; electrostatic voltmeters; electro dynamometer type; electromagnetic type; reading instruments; parallax; care of instruments.

The Wheatstone bridge; post office bridge; how to use the bridge.

Forms of portable sets and how to use them; Queen bridge; Willyoung bridge; Whitney bridge; Sage ohmmeter; Evershed testing set.

Current flow and e. m. f.; galvanometer constant; direct deflection method; with Queen set; with voltmeter; testing resistance of galvanometer; five methods of battery testing.

The potentiometer; checking voltmeter; checking e. m. f.; use of various portable testing sets.

Charge and discharge of condenser; testing capacity and insulation of condenser; loss of charge method.

Cable testing; capacity; insulation and conductivity; locating cable faults; Varley test; Murray test..

Testing with voltmeter; testing wiring; insulation of generator; e. m. f. around commutator; measuring drop; testing high e. m. f. with low reading voltmeter; temperature and resistance; testing temperature by rise of resistance; testing filed coils; testing armature coils; plotting curves of tests.

Address all orders accompanied by the cash, to J. B. Taltavall, 253 Broadway, New York.

Important Subjects Treated in Back Numbers.

TELEGRAPH AGE has published the best articles on telegraphic subjects that have ever appeared in print. Herewith 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.

Adjustment of Relays and Sounders....Oct. 1, 1902
Alternating Current Transformer for Quadruplex, W. H. Jones, Mch. 1-16, 1904
American Cable Across the Pacific....July 16, 1903
Alaskan Telegraphs....Jan. 1-16, Feb. 1, 1905
Atmosphere and Earth Electrical Conditions, E. C. Walker, Dec. 16, 1904
Aurora Borealis, The....Nov. 16, Dec. 16, 1903
Autoplex, The....Feb. 1, 1903
Barclay Combination Quadruplex Rheostat....July 1, 1903
Barclay's Direct Repeating Relay for Multiplex Circuits..July 16, 1902
Barclay Printing Telegraph System, W. H. Jones....May 16, 1905
Barclay's Repeating Relay, Main Line Relay and Box Relay, Jan. 1, 1903
Barclay Typewriting Telegraph System....Jan. 16, 1904
British Patent Office Rules....Apl. 16, 1905
British System of Timing Messages....Dec. 1, 1902
Buckingham Long Distance Page Printing Telegraph....Sept. 1, 1902
Burry Page Printing Telegraph....Apl. 1, 1903
Cables and Russo-Japanese War....Apl. 1, 1904
Cable Station in Mid-Pacific, Our, Dr. Martin Crook....Feb. 16, 1905
Central Cable Office, New York....June 1, 1903
Central Telegraph Office, London....Oct. 16, 1904; May 1, 1905
C. K. Jones' Automatic Telegraph Circuit Protector and Signaling Machine....June 16, 1903
Collins Overland Telegraph....May 16, 1903
Composite Circuits—Report Com. Assn. Ry. Tel. Supts., Sept. 1, 1904
Composite Teleg. and Telep. on Canadian Pacific Ry....Mch. 1, 1904
Composite Telephone Lines....Mch. 1, 1905
Crehore-Squire Automatic Telegraph System....May 16, 1902
Definitions of Electrical Terms, Mch. 16, Apl. 1-16, June 1, July 1-16, 1904
Delany's, P. B., Automatic Telegraph System....Mch. 16, 1903
Delany's, P. B., New System of Rapid Telegraphy....Apl. 16, 1904
Direct Polar Relay Repeater of the Postal Telegraph-Cable Company....Oct. 16, 1903
Earth Currents....May 1, 1903
Engraving of Clarence H. Mackay....Nov. 16, 1902
Engraving of Col. Robert C. Clowry....Apl. 16, 1902
Engraving of the Late John W. Mackay....Aug. 1, 1902
Field's, S. D., Amplifier....Nov. 1-16, 1904
Field's, S. D., Quadruplex....May 1-16, 1904
Flow of Electricity in the Earth....Dec. 16, 1903
Ghegan Automatic Repeater....June 1, Dec. 1, 1903
Ghegan's, J. J., Multiplex System....Aug. 1, 1904
Gray Submarine Signaling Apparatus....Jan. 1, 1904
Hand vs. Machine Telegraphy....Sept. 16, 1902
Hard Drawn Copper Wire, F. W. Jones....Nov. 1, 1903
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