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THE TELEGRAPHIC
HISTORICAL SOCIETY

OF

NORTH AMERICA

ORGANIZED AT WASHINGTON, D. C.

DECEMBER 5, 1894



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WASHINGTON, D. C.
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The Telegraphic Historical Society

OF NORTH AMERICA,

OFFICE, No. 800 H STREET NORTHWEST.

WASHINGTON, D. C.

PRESIDENT.

ALONZO B. CORNELL, Ithaca, New York.

FIRST VICE-PRESIDENT.

S. H. KAUFFMANN, Washington, D. C.

SECOND VICE-PRESIDENT.

WM. B. WILSON, Philadelphia, Pa.

THIRD VICE-PRESIDENT.

THOMAS D. LOCKWOOD, Boston, Mass.

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WM. R. PLUM, Chicago, Ill.

J. Q. MASON, Takoma, Washington.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA,

ORGANIZED AT WASHINGTON, D. C., DECEMBER 5, 1894.

PRELIMINARY STEPS.

Correspondence and conference between a large number of telegraphers, residing in various localities, which had been carried on for a year or more, resulted in the issuance of the following circular :

WASHINGTON, D. C., September 2d, 1894.

DEAR SIR:

Quite a number of Telegraphers, in this vicinity and elsewhere, have been informally discussing the advisability of organizing a Telegraphic Historical Society for the purpose of collecting, preserving and publishing historical information relating to the establishment and development of the Telegraph in North America, and I have been requested to ask your views on the subject and solicit your co-operation in carrying forward the plan.

There is every prospect that a large number of representative men will unite in the undertaking and that the proposed society can be made very successful and useful.

The enclosed cards are issued for the purpose of obtaining the names of persons desirous of taking part in organizing the society. They may be signed and forwarded to any of the persons whose addresses are annexed.

Please give the addresses of persons to whom this invitation should be sent.

Yours very respectfully,

GEO. C. MAYNARD.

Thomas D. Lockwood, American Bell Telephone Co., Boston.

Charles A. Tinker, W. U. Telegraph, New York City.

J. H. Emerick, Postal Telegraph, New York City.

Charles Selden, B. & O. Telegraph, Baltimore.

L. C. Weir, Adams Express Co., Cincinnati.

Wm. Kline, Lake Shore R. R., Toledo.

A. H. Bliss, No. 2 Sherman Street, Chicago.

C. W. Hammond, Missouri Pacific Railway, St. Louis.

W. C. Walstrum, Roanoke, Va.

B. F. Dillon, Jacksonville, Fla.

Geo. C. Maynard, No. 800 H Street N. W., Washington, D. C.

In response to this notice two hundred and sixty persons endorsed and agreed to join in the movement, whereupon the following call for a meeting was issued :

WASHINGTON, D. C., November 3, 1894.

DEAR SIR:

A meeting of the persons who have agreed to co-operate in organizing a Telegraphic Historical Society will be held in Washington, D. C., at 2 P. M., Wednesday, December 5th, 1894. On that occasion a constitution will be adopted, officers elected and plans for carrying forward the purposes of the society be determined upon. It is earnestly hoped you will be present.

If you find it impossible to attend the meeting, please write or telegraph your views or wishes on any points relating to the formation of the society or its objects and, if you choose, you may sign and return the enclosed proxy.

The payment of two dollars will cover the regular dues up to January 1st, 1896, and the amount may be remitted, at any time before the meeting, to S. H. Kauffmann, President Evening Star Newspaper Company, Washington, D. C., who will hand all receipts to the Treasurer.

Please extend this notice to any telegraphers whom you wish to recommend as charter members of the organization and have their applications sent in.

Thomas D. Lockwood, American Bell Telephone Co., Boston, Mass.
 Franklin L. Pope, Great Barrington, Mass.
 Charles A. Tinker, Gen'l Superintendent W. U. Telegraph, New York City.
 J. H. Emerick, General Superintendent Postal Telegraph, New York City.
 L. C. Weir, President Adams Express Co., New York City.
 S. P. Gifford, Superintendent W. U. Telegraph, Syracuse, N. Y.
 Charles Selden, Superintendent B. & O. Telegraph, Baltimore, Md.
 Wm. Kline, Superintendent Telegraph Lake Shore R. R., Toledo, Ohio.
 A. H. Bliss, No. 2 Sherman Street, Chicago, Ill.
 Geo. M. Dugan, Superintendent Telegraph Illinois Central R. R., Chicago, Ill.
 C. W. Hammond, Superintendent Missouri Pacific Railway, St. Louis, Mo.
 W. C. Walstrum, Superintendent Telegraph, Roanoke, Va.
 B. F. Dillon, Superintendent W. U. Telegraph, Jacksonville, Fla.
 Morell Morean, Manager W. U. Telegraph, Washington, D. C.
 W. H. Allen, Manager Postal Telegraph, Washington, D. C.
 D. P. McKeever, Superintendent Pennsylvania R. R., Washington, D. C.

Replies may be addressed to

GEO. C. MAYNARD,
 No. 800 H Street N. W.,
 Washington, D. C.

The meeting was held, as announced, in the rooms of the Washington Board of Trade, which had been tendered free of charge.

A large number of the signers of the agreement were present or represented by proxies.

Mr. Maynard, in calling the meeting to order, said: "In this era of societies, when every man might belong to more organizations than there are days in the month, we may be regarded by some persons as very rash in assembling to-day with the avowed purpose of forming a new one, but there are two classes of societies now-a-days. One is made up of men possessed of a lively ambition to wear showy badges, to march behind a brass band and to eat a good dinner at the expense of somebody else. If we had no better purpose in view we would do well to stop where we are and go home. But where there is a definite, useful object, in which many men have a common interest, then organization, concentration of effort and division of labor, under systematic method and wise administration, will secure valuable results that can be attained in no other way. This is the spirit and the reason of this movement. Its purposes and its methods will undoubtedly develop as the business of the meeting proceeds. That the business may be transacted properly and with despatch a good presiding officer is necessary, and I take much pleasure in nominating, as the chairman of this meeting, a gentleman well-known as possessing all the qualifications for the position—Mr. Thomas D. Lockwood, of Boston." The nomination was seconded by Wm. B. Wilson, of Philadelphia, and Mr. Lockwood was unanimously elected.

Mr. Lockwood, on taking the chair, said: "*Gentlemen*, I thank you very much for this compliment. As many of you know very little about my ability as a presiding officer I must take it as nothing else than a compliment. I am happy to think that my prerogatives are but temporary, and that I shall soon be able to transfer my duties to some other shoulders better qualified to bear them.

"I am very glad, indeed, that this opportunity has arisen for the organization and establishment of a Telegraphic Historical Society. I think there is great credit due to our friend, Mr. Maynard, for suggesting this matter, and for his service in bringing it to the present point. It is a very agreeable surprise to me to see so many earnest faces here, and to realize

that so deep an interest is felt in the subject. This is to me a very good omen and gives promise that a society will indeed be created, and that it will not only manage to exist, but will really be one of great influence and usefulness.

“The meeting is open for whatever may come before us.”

“I presume the first business coming properly before the meeting will be the election of a provisional secretary.”

On motion of Mr. Wilson, W. H. Smith, of Washington, was elected secretary.

On motion of Mr. Morell Marean the chair appointed Charles H. Haskins, of New York, and N. R. Young, of Washington, a committee on credentials. While the committee was examining the lists of names and the proxies a large number of letters cordially endorsing the movement were read, and the chairman, Mr. Lockwood, made the following statement :

THE CHAIRMAN. “It is manifest from the number of interesting communications which have been read that there is a widespread interest in this movement. It is now necessary for all of us to remember that if we go into it at all it will be necessary to go into it with heart as well as hand, and hand as well as heart. As Mr. Maynard remarked some time ago, or as he intimated, rather, there are enough organizations now of the ultra-convivial order. I had hoped, at one time, that in ‘The Old Timers’ Association’ something of this kind might be incorporated ; but our experience with that association shows that it has not time to properly look after historical matters. It appears to me to be a very much better plan that there should be a historical association with nothing else to do but to look after the matters relating to the telegraph and cognate subjects ; and after the history of those matters in which we are principally and primarily interested. Therefore I think that, if it is the sense of this organizing meeting, that we have sufficient encouragement in the persons present, and in the persons who have written to us, to lead us to believe that there will be enough active interest in it to make it a success and a useful success, we have nothing else to do but to go ahead with it, which should be both our duty and our pleasure.”

MR. WILSON. “Mr. Chairman, I feel exactly as you do and agree entirely with the sentiments that you have expressed. I

am a very busy man every day of my life. I have not been identified with the telegraph for thirty years, and yet, recognizing that it was the medium by which I received my education and through which I was enabled to succeed in other lines of endeavor, I have always felt the greatest possible interest in the profession of telegraphy. I joined the 'Old Timers' for the sole and single purpose of aiding in the preservation of historical facts in connection with the telegraph. The telegraph was the great developer of this country. Without it the railroads never could have extended as they have done throughout this country. It was absolutely necessary that it should be invented before the railroad could become a success. We have reached a point in its history where it is gradually growing into romance. The facts are still obtainable as to what occurred fifty years ago; but they are being tinged with a little bit of romance. Now, we want to get over that. We want to get down to the facts. This history of the telegraph will exist throughout all time. It is a part and parcel of the history of this country. Therefore we must act with a great degree of caution, and make up our minds to work, and to work hard. We cannot afford to establish a national historical society and then let it degenerate into a convivial meeting. It means real, serious, hard, literary work. It means that every man of us has to rise above all external influences and tell the truth, and preserve it.

"A great deal will depend upon our starting right in our organization. I do not know whether there have been any by-laws outlined as yet; but I think that the general object should be outlined before we go very much further, if it has not already been done. I am heartily in accord with you in this matter; and I am ready to take off my coat and do literary work. I am not prepared to sing the praises of any man in the telegraph business. I am not prepared to come to Washington to attend a banquet and to drink wine at the expense of other people; and I think this is the feeling of every man here.

THE CHAIRMAN. "I think I know sufficient about the proposed organization, so far as it has gone, to say that there has been a draft of a constitution prepared. But before that question is considered and disposed of, I think we should con-

sider the primary question as to whether, in the sense of this meeting, including persons and proxies, it is desirable to have an association of this kind. While the Committee on Credentials is finishing its work I will take the opportunity to read a communication I sent to Mr. Maynard in case I should not have been able to attend this meeting, giving my ideas with regard to it, which are probably no better, and perhaps not so good, as the ideas of others, concerning the line of work this Society might take up. If I hear no objection I will assume that unanimous consent is given, and will read it :

If the old historic and legendary telegraphic lore including facts, anecdotes, old books, old documents, and perhaps old instruments, is ever to be collected and conserved, it is evident that we must now set about the work before its memory fades, and before the first generation of telegraphists has totally passed away.

I think, therefore, that the idea of a Telegraphic Historical Society is an admirable one, and that the present is the time for its formation.

Although not as old a telegrapher as some here, I have perhaps more than many others been accorded opportunities for accumulating facts and points concerning the history of the art of telegraphy, and, I may say, the other arts also which are founded on the science of electricity ; and for this reason I feel qualified to point out some lines of operation which a Telegraphic Historical Society should prosecute.

1. Such a society to be successful should not long delay in securing for itself an abiding place or headquarters, even though for the first five years of its existence such a home be a seven-by-nine room, or a corner in the office of some older organization.

2. Its secretary, on whom the work of the society will chiefly devolve, should be a man with a taste for historical research and accumulation, and one who is able and who will take a personal interest in the work.

3. The society should, I conceive, at once begin the collection of the older American works on the telegraph and the older periodicals which, as we remember, were born, lived an ephemeral but interesting life, and died.

Of the former class, I may name "The Electro-Magnetic Telegraph" of Alfred Vail, and the "Manual of Telegraphy," Shaffner; "Electro-Magnetic Telegraph," Turnbull, and "Theory and Practice of the Telegraph," Prescott; and of the latter, "The Telegraph Magazine" of Donald Mann, the real editor of which was Henry Brooks O'Reilly; "Shaffner's Telegraph Companion," "The Telegrapher," the few numbers of "The Telegraphic Journal," which was edited by Jerry Borst, and the earlier volumes of the "Journal of the Telegraph."

4. Each member should once a year write some original paper relating to telegraphic history, or some compilation of statements of facts in telegraphic history; and these should be printed, distributed among the members, and preserved in the archives.

Of course, knowing what we do of the working of societies, we know that many members will not, and it is therefore perfectly safe to say as above that "each member should." At any rate, we should aim to have twelve good historical papers per year.

5. A desirable thing for the society to do will be to compile all the procurable information regarding the invention and early history of the Morse telegraph, in order that a correct and impartial judgment may be made between the ideas of those who follow the old fashion and hold that Morse is the inventor of the American telegraph, and the claims of those who are imbued with the leaven of the new fashion, and hold that as between Morse and Vail, the latter was the real creator of the electro-magnetic telegraph. The real truth will probably be found to lie between these extremes.

6. That the above may be faithfully and truly done, it will be advisable that the society shall concern itself also with the electric telegraph as it was developed in European countries; otherwise we shall be apt to run to the foolish habit of making scientific achievement a subject of national self-gratulation. What we should desire is fact.

7. The society should also, in due season, address itself to bringing out a true and complete history of the genesis, rise and progress of cable telegraphy, and of multiple telegraphy in

all its forms; and on all of these subjects members should be invited to bring in special papers to be presented at stated meetings of the society (probably one per annum), at which the discussion should be full and free.

8. We should aim to accumulate and, in some degree, to publish or circulate biographies of the great names of American and other telegraphers; and, wherever possible, should obtain the pictures of such persons for the adornment of the society office walls or album.

No doubt many other lines of work and research will occur to members, especially after the society has been organized; but enough is said in this paper to indicate some of the subjects with which, as it seems to me, the society may properly deal, and I submit the same for your consideration.

Mr. Haskins, from the Committee on Credentials, reported that the list of names of the signers of the agreement was accurately made out and the proxies were all regular, and the report was accepted.

Mr. Wilson then moved that the persons here assembled under their own authority and that of the persons they represent by proxy, do hereby constitute themselves into the Telegraphic Historical Society of North America. The motion was seconded by Mr. Marean and unanimously adopted.

The signers to the agreement, two hundred and sixty in number, were then declared to be members of the society. Their names are as follows:

Adams, A. S., Western Union Telegraph, Washington, D. C.

Adams, C. C., Superintendent Postal Telegraph Company, Philadelphia, Pa.

Albee, George H., Telegraph Operator, Windsor, Conn.

Allen, W. H., Manager Postal Telegraph Office, Washington, D. C.

Andrews, Wm. R., Physician, Rockville, Md.

Annett, C. F., Assistant Superintendent Telegraph Illinois Central R. R., Chicago, Ill.

Arbuckle, Frank P., Receiver Public Monies, Denver, Colo.

Ash, James R., Post Office Department, Washington, D. C.

- Ash, Wm. M., Dentist, 473 Florida avenue N. W., Washington, D. C.
- Austin, J. B., The United Press, Washington, D. C.
- Baker, L. C., Superintendent Western Union Telegraph Company, St. Louis, Mo.
- Balsley, John T., Freight Train Master, P. R. R., thirty-second and Market streets, Philadelphia, Pa.
- Barr, M. W., Government Printing Office; 822 First street, Washington, D. C.
- Barron, A. M., Superintendent Southwestern Electric Light and Water Power Company, Joplin, Mo.
- Bates, D. H., General Eastern Manager The Bradstreet Company, New York City.
- Bennett, John C., Chief Clerk, Missouri Pacific R. R., St. Paul, Minn.
- Bickford, F. T., Journalist, 1912 Fifteenth street, Washington, D. C.
- Bivins, John T., 1407 Pierce Place N. W., Washington, D. C.
- Bliss, A. H., Merchant, 2 Sherman street, Chicago, Ill.
- Blivin, C. E., 218 La Salle street, Chicago, Ill.
- Bodell, W. J., Manager Western Union Telegraph, Fortress Monroe, Va.
- Booth, N. M., Deputy Treasurer, Evansville, Ind.
- Boyd, J. W., Fire Insurance, 64 Fourth avenue, Pittsburg, Pa.
- Boyle, J. P., Superintendent Telegraph K. & W. R. R., Keokuk, Iowa.
- Bradley, C. W., General Superintendent West Shore R. R., 225 Central Park West, New York City.
- Brimson, W. H., Division Superintendent N. P. R. R., Missoula, Mont.
- Brown, E. O., Insurance Agent and Adjuster, Toledo, Ohio.
- Brown, G. F., Chief Despatcher and Division Operator, P. C. & St. L. Ry., Pittsburg, Pa.
- Brownson, W. G., District Agent, Berkshire Life Insurance, No. 2 Bee Building, Toledo, Ohio.
- Buell, Madison, Quad Chief, Western Union Telegraph Company, Buffalo, N. Y.

- Bullard, S. K., Superintendent Telegraph M. K. & T. Ry.,
Sedalia, Mo.
- Busbee, J. T., Train Despatcher, Raleigh, N. C.
- Callum, R. G., General Manager Mutual District Telegraph,
1428 F street N. W., Washington, D. C.
- Camp, O. C., Cashier, National Bank of Tarentum, Tarentum,
Pa.
- Campbell, R. B., General Manager B. & O. R. R., Baltimore,
Md.
- Carnegie, Andrew, 5 West Fifty-first street, New York City.
- Cassidy, James P., Manager Western Union Telegraph Office,
Minneapolis, Minn.
- Chase, Durfee C., General Manager Premier Egg Cup Com-
pany, Syracuse, N. Y.
- Childs, A. F., Gold Mining, Chloride, New Mexico.
- Church, H. E., Telegraph Operator, 1322 Sixty-first street,
Chicago, Ill.
- Clark, Dr. James J., Forest Glen, Md.
- Clarke, W. H., Maltby Building, Washington, D. C.
- Cline, A. T., Division Operator B. & O. R. R., Grafton, W. Va.
- Clohesey, Thomas F., Electrical Engineer, Nos. 16-19 Pike
Building, Cincinnati, Ohio.
- Closs, T. A., Manager Postal Telegraph Company, Atlanta, Ga.
- Cobb, Emory, Banker, Kankakee, Ill.
- Collins, Sumner J., General Superintendent Wisconsin Central
Lines, Milwaukee, Wis.
- Compton, J., Superintendent Western Union Telegraph Com-
pany, Nashville, Tenn.
- Connor, Paul D., 1439 P street, Washington, D. C.
- Converse, John H., Manufacturer, Baldwin Locomotive Works,
Philadelphia, Pa.
- Corbett, C., Superintendent Western Union Telegraph Com-
pany, Cleveland, Ohio.
- Cord, T. O., Manager Western Union Telegraph, Pekin, Ill.
- Cornell, Alonzo B., New York City.
- Cosgran, W. P., Superintendent W. & St. P. R. R., Winona,
Minn.
- Couch, F. L., Chief Despatcher, Selma, Ala.

- Cowlam, George B., Madison, Ind.
- Cruise, J. D., Manufacturers' Agent, Massachusetts Building,
Kansas City, Mo.
- Curry, Edward, Treasurer Staten Island Rapid Transit R. R.
Company, foot Whitehall street, New York City.
- Cuyler, Theodore L., Jr., Treasurer Postal Telegraph Cable
Company, 253 Broadway, New York City.
- Danley, R. J. M., No. 101 Clinton Building, Columbus, Ohio.
- Darnton, C. A., Superintendent Telegraph Southern Ry. Com-
pany, Washington, D. C.
- Davin, Thomas A., Telegraph Operator, 40 Water street,
Boston, Mass.
- Davis, A. G., President Viaduct Manufacturing Company, Bal-
timore, Md.
- Davis, W. L., Chief Despatcher I. C. R. R., corner South and
Calhoun streets, Memphis, Tenn.
- Dawson, D. C., Superintendent Western Union Telegraph Com-
pany, St. John, N. B., Canada.
- De Graw, P. V., General Southern Manager, the United Press,
Washington, D. C.
- Dennis, L. B., Engineer and Operator, B. P. L. Company,
Cygnet, Ohio.
- Dillon, B. F., Superintendent Western Union Telegraph, Jack-
sonville, Fla.
- Donnelly, John M., Assistant Yardmaster Pennsylvania Rail-
road, 629 Muench street, Harrisburg, Pa.
- Doyle, James, City Editor, The American, Baltimore, Md.
- Dugan, George M., Superintendent Telegraph I. C. R. R.,
Chicago, Ill.
- Dugan, R. W., Superintendent and Treasurer, Champion Ice
Company, Covington, Ky.
- Dulin, W. E., Clerk, Bureau of Pensions, Washington, D. C.
- Earle, Wm. E., Chief Operator, Western Union Cable, North
Sidney, C. B., Canada.
- Eastbrook, W. N., Vice-President and General Manager N.
Y. & Pa. T. & T. Co., Elmira, N. Y.
- Eastburn, S. E., Agent, B. & O. R. R., Rockville, Md.

- Eckert, W. H., President Bi-metallic Electric Transmission Company, 80 Broadway, New York City.
- Emerick, J. H., General Manager Postal Telegraph, New York City.
- English, A. F., Department of Agriculture, Washington, D. C.
- English, Shirley M., Chief Operator Postal Telegraph Company, New Orleans, La.
- Evans, Frank H., Quartermaster-General's Office, Washington, D. C.
- Evans, G. E., Superintendent Transportation, L. & N. Ry. Company, Louisville, Ky.
- Faling, A. C., Telegraph Operator, Kalamazoo, Mich.
- Farnham, I. H., Electrical Engineer, 125 Milk street, Boston, Mass.
- Farnsworth, George, Superintendent Construction Detroit Public Lighting, 62 Garfield avenue, Detroit, Mich.
- Fenn, J. E., Electrician Western Union Telegraph Company, Memphis, Tenn.
- Field, Stephen D., Electrical Engineer, Stockbridge, Mass.
- Fisher, D. M., Operator and Agent B. & O. R. R., Laurel, Md.
- Flaharty, A. I., Station Agent, Pennsylvania Company, Bucyrus, Ohio.
- Fonda, Ten Eyck A., Ticket Agent, Union Depot, Omaha, Neb.
- Fuller, W. G., Manufacturer, Gallipolis, Ohio.
- Garvin, George J., Chief Dispatcher and Operator, La Junta, Colo.
- Garwood, S. S., Bell Telephone Company, 406 Market street, Philadelphia, Pa.
- Gibbons, T. D., Broker, Jacksonville, Fla.
- Gifford, S. B., Superintendent Western Union Telegraph, Syracuse, N. Y.
- Gogel, Charles H., Confectioner, 717 Mosher street, Baltimore, Md.
- Gough, R. S., Manager U. S. Yards, Chicago, Ill.
- Gould, A. F., Manager Western Union Telegraph Company, Cincinnati, Ohio.
- Greene, E. C., Hotel Broker, Manhattan Building, Chicago, Ill.

- Greene, O. C., Superintendent Telegraph N. P. R. R., St. Paul, Minn.
- Griswold, George W., Sr., Hamilton, Ohio.
- Guild, James H., Superintendent Telegraph Oregon Railway & Navigation Company, Portland, Ore.
- Guthridge, Jules, Journalist, 1713 Riggs Place, Washington, D. C.
- Gill, W. B., Superintendent Western Union Telegraph, Philadelphia, Pa.
- Hall, Goff A., Assistant Assessor, D. C., 60 C street N. W., Washington, D. C.
- Hallam, Isaac W., Manager Western Union Telegraph, Wilmington, Del.
- Hallenbeck, A. J., Chicago Great Western Railway Company, St. Paul, Minn.
- Hamilton, George A., Electrician, 532 Morris avenue, Elizabeth, N. J.
- Hammond, C. D., Superintendent D. & H. R. R., Albany, N. Y.
- Hammond, C. W., Superintendent Telegraph, Mo. Pac. R. R., St. Louis, Mo.
- Hankinson, R. H., Merchant and Farmer, Hankinson, N. D.
- Hargrave, Jesse, Night Chief Operator Postal Telegraph Company, New Orleans, La.
- Harrison, G. W., General Passenger Agent W. Va. C. & P. Ry. Company, Piedmont, W. Va.
- Hart, Malcolm, Private Secretary, 521 Presstman street, Baltimore, Md.
- Haskins, Charles H., Banker, 80 Broadway, New York City.
- Hayward, Albert, Superintendent Telegraph B. & O. S. W. Ry., Cincinnati, Ohio.
- Heaton, Charles M., 14 Grant Place, Washington, D. C.
- Heaton, C. M., Jr., 620 F street, Washington, D. C.
- Henderson, George, Agent E. C. D. Line, Newbern, N. C.
- Hine, C. C., Publisher, 137 Broadway, New York City.
- Hoge, James D., Publisher Courier, Zanesville, Ohio.
- Holland, W. A., Assistant Train Master N. Y. C., 349 Fifth avenue, New York City.
- Hudgings, D. S., Superintendent Telegraph, Raleigh, N. C.

- Hughart, H. F., Telegrapher, Sault Ste Marie, Mich.
 Hughart, W. O., Zellwood, Fla.
 Hunt, Samuel, President C. P. & V. R. R., Cincinnati, Ohio.
- Jenks, Orin, Agent B. & O. R. R., Mannington, W. Va.
- Kates, John N., Division Operator P. W. & B. R. R., Wilmington, Del.
 Kauffmann, S. H., President Evening Star Newspaper Company, Washington, D. C.
 Kelton, Frank, Chief Operator Western Union Telegraph Company, Buffalo, N. Y.
 Kennan, George, 1318 Massachusetts avenue N. W., Washington, D. C. ; Baddeck, C. B., Nova Scotia.
 King, James H., Cashier Western Union Telegraph Company, Washington, D. C.
 Kinsman, G. C., Superintendent Telegraph Wabash R. R. Company, Decatur, Ill.
 Kline, William, Superintendent Telegraph Lake Shore Lines, Toledo, Ohio.
- La Dow, R. N., 1828 S street, Washington, D. C.
 Lang, G. L. Superintendent Telegraph N. Y. & N. E. R. R., 180 Summer street, Boston, Mass.
 Lea, Samuel J., 1618 Presstman street, Baltimore, Md.
 Leloup, Edward, Manager Postal Telegraph Company, New Orleans, La.
 Lemon, L., Manager Postal Telegraph Company, Baltimore, Md.
 Leonard, M. B., Superintendent Telegraph C. & O. Ry., Richmond, Va.
 Lewis, George F., Clerk Assistant Train Master's Office, B. & P. R. R., Washington, D. C.
 Lewis, W. T., President Mitchell & Lewis Company, Racine, Wis.
 Little, John Jay, Clerk, 1511 R street, N. W., Washington, D. C.
 Livermore, Charles D., Manager Western Union Telegraph, Portland, Me.
 Lockwood, Thomas D., Electrical Engineer, 125 Milk street, Boston, Mass.
 Logue, William S., with Thomas A. Edison, Orange, N. J.

- Lonergan, John, Agent U. P. Ry., Marysville, Kans.
Lovekin, W. H., Toledo, Ohio.
- Mackie, John F., Train Despatcher C. R. I. & P. R. R., 4607
Vincennes avenue, Chicago, Ill.
- Marean, Morell, Manager Western Union Telegraph Office,
Washington, D. C.
- Mason, Frederic G., Auditor The United Press, N. Y., 51
Hawthorne avenue, East Orange, N. J.
- Mason, J. Q., Superintendent Telegraph Northern Pacific R.
R., Tacoma, Wash.
- Maxwell, W. K., General Baggage Agent M. K. & T. Ry.,
Parsons, Kans.
- Maynard, Geo. C., Electrical Engineer, 800 H. street N. W.,
Washington, D. C.
- McAleese, Chas. J., Superintendent Fire Alarm Telegraph,
635 W. Franklin street, Baltimore, Md.
- McColgan, James, Attorney-at-Law, 18 E. Lexington street,
Baltimore, Md.
- McCoy, D. B., Superintendent N. Y. C. & H. R. R., Grand
Central Station, New York City.
- McGrew, Frank L., Telegraph Operator, Pekin, Ill.
- McKeever, Daniel P., Superintendent B. & P. R. R., Wash-
ington, D. C.
- McKelvey, A. T., Farmer and Fruit Grower, St. Clairsville,
Ohio.
- McKenna, E. W., General Superintendent G. N. Ry., St. Paul,
Minn.
- McKinnon, N., Superintendent Telegraph T. St. L. & K. C.
R. R., Toledo, Ohio.
- McKinstry, James P., General Manager the Cleveland Tele-
phone Company, 316 Seneca street, Cleveland, Ohio.
- McReynolds, C. W., Transfer Business, Gillett, Colo.
- Miller, I. N., Superintendent Western Union Telegraph Com-
pany, Cincinnati, Ohio.
- Milliken, Geo. F., General Manager, Gamewell Auxiliary Fire
Alarm Co., 19 Pearl street, Boston, Mass.
- Montgomery, Benj. F., Executive Mansion, Washington,
D. C.

- Moorhead, J. C., General Superintendent N. Y. L. E. & W. and C. & E. R. R., 1255 Willson avenue, Cleveland, Ohio.
- Morrison, J. F., Manager Maryland Electric and Manufacturing Company, 15 South street, Baltimore, Md.
- Moss, H. E., Fruit Broker, Second and Main streets, Kansas City, Mo.
- Mozier, A. M., Superintendent Transfer N. Y. L. E. & W. R. R., Cleveland, Ohio.
- Murray, P. J., Manufacturer Cotton Seed Oil, Jackson, Tenn.
- Naylor, A. W., Box No. 955, Pittsburgh, Pa.
- Newham, J. C., Chief Operator, Grafton, W. Va.
- Nolan, John T., B. & O. R. R., Washington, D. C.
- Orbison, J. L., Superintendent Telegraph C. H. & D. R. R., Cincinnati, Ohio.
- Painter, U. H., Journalist, Box No. 82, Washington, D. C.
- Peabody, S. P., General Agent and Assistant Superintendent B. & O. R. R., Columbus, Ohio.
- Petersen, Chas., Superintendent Delaware and Hudson Canal Company Telegraph Department, Honesdale, Pa.
- Pettengill, H. J., Superintendent Postal Telegraph Company, 220 Devonshire street, Boston, Mass.
- Pettit, J. E., Manager Postal Telegraph, 145 Campbell avenue, Chicago, Ill.
- Phelps, Ransom, Real Estate and Loans, Breckenridge, Minn.
- Pitcairn, Robert, General Agent and Superintendent P. R. R., Pittsburgh, Pa.
- Plum, Wm. R., Lawyer, 78-80 La Salle street, Chicago, Ill.
- Plush, Samuel M., Bell Telephone Company, 406 Market street, Philadelphia, Pa.
- Pope, Franklin L., Electrical Engineer, Great Barrington, Mass.
- Purnell, John H., Manager Western Union Telegraph Company, Opelika, Ala.
- Rabbit, W. F., B. & O. R. R., Rockville, Md.
- Redding, J. D., Agent and Operator, Richland, Pasco Co., Fla.

- Reed, Henry A., Secretary Bishop Gutta Percha Company,
420-26 East 25th street, New York City.
- Reed, John H., Greensburg, Pa.
- Reid, James D., U. S. Consul, Dunfermline, Scotland.
- Reid, Robert T., Manager Western Union Telegraph Company,
Tacoma, Wash.
- Reilly, J. C., Superintendent New York and New Jersey Tele-
phone Company, 16 Smith street, Brooklyn, N. Y.
- Reynolds, H. D., Superintendent Telegraph, 207 Main street,
Buffalo, N. Y.
- Rhoads, C. S., Superintendent Telegraph, C. C. C. & St. L.
Ry., Indianapolis, Ind.
- Richards, A. R., Manager Postal Telegraph Company, Kansas
City, Mo.
- Robertson, C. C., Real Estate and Financial Broker, N. E.
Cor. Bay and Main streets, Jacksonville, Fla.
- Royce, Fred W., Dealer in Electrical Supplies, 1410 Pennsyl-
vania avenue, Washington, D. C.
- Safford, A. G., Lawyer, 2422 Fourteenth street, Washington,
D. C.
- Sanborn, F. A. H., Manager Western Union Telegraph Office,
Brownsville, Tex.
- Sargent, W. D., General Manager New York and New Jersey
Telephone Company, Brooklyn, N. Y.
- Schilling, Emil, Transcriber of Records, Tazewell County,
Pekin, Ill.
- Schoyer, A. M., Superintendent Telegraph, Penna. Lines,
Pittsburgh, Pa.
- Schram, W. D., Chief Clerk, General Superintendent's Office,
Western Union Telegraph, 194 Broadway, New York City.
- Selden, Chas., Superintendent Telegraph B. & O. R. R.,
Baltimore, Md.
- Selden, J. E., Matteawan, N. Y.
- Seyfer, Robert P., Manager Postal Telegraph Company,
Pekin, Ill.
- Shaw, D. C., Manager Postal Telegraph Company, Bath, Me.
- Showerman, I. C., Telegrapher, 1002 Lincoln avenue, Port
Huron, Mich.

- Smith, Geo. H., T. A. L. S. T. & T. Ry., West Superior, Wis.
- Smith, Jos. B., Operator B. & O. Telegraph, Annapolis, Junction, Md.
- Smith, Suel, Agent Gold and Stock Telegraph Company, 35 Congress street, Boston, Mass.
- Snyder, Benj. P., President National Safe Deposit Company, Washington, D. C.
- Speer, J. F., 1568 Washington avenue, Denver, Colo.
- Sprague, H. C., Superintendent Telegraph, Thayer Building, Kansas City, Mo.
- Stanton, O. L. B., Mining, Black Hawk, Colo.
- Stephenson, I., Superintendent Grand Trunk Ry., Montreal, Canada.
- Stover, Jos. W., President The Gamewell Fire Alarm Tel. Company, 1½ Barclay street, New York City.
- Summers, C. H., Electrician, Room 815, Western Union Telegraph Building, Chicago, Ill.
- Sumwalt, Theo., Agent P. W. & B. R. R., Baltimore, Md.
- Swartwout, S. P., Accountant and Architect, Galesburg, Ill.
- Taff, H. F., Western Union Telegraph Office, Washington, D. C.
- Talcott, A. B., Real Estate Dealer, 300 B street S. E., Washington, D. C.
- Taltavall, John B., Publisher The Telegraph Age, 253 Broadway, New York City.
- Taylor, W. F., Division Operator P. R. R., Altoona, Pa.
- Terhune, J. R., Manager Western Union Telegraph Company, Lexington, Ky.
- Thomas, John, General Agent Berkshire Life Insurance Company, 122 Euclid avenue, Cleveland, Ohio.
- Thompson, J. W., Manager Sunset Telephone and Telegraph Company, San Diego, Cal.
- Thompson, T. W., Farmer, Fruit Grower and Dealer, Carbondale, Ill.
- Thurston, J. D., Western Union Telegraph, 1201 F street, N. W., Washington, D. C.
- Tillinghast, J. W., Manager Western Union Telegraph Company, Buffalo, N. Y.

- Tinker, Charles A., General Manager Western Union Telegraph, 195 Broadway, New York City.
- Tuttle, H. A., General Superintendent N. A. Telegraph Company, Minneapolis, Minn.
- Van Duzer, J. C., Publisher, Escanaba, Mich.
- Wade, K. H., General Manager Southern California Ry., Los Angeles, Cal.
- Wallick, John F., Superintendent Western Union Telegraph Company, Indianapolis, Ind.
- Walmsley, John, Merchant, Sedalia, Mo.
- Walstrum, W. C., Superintendent N. & W. R. R., Roanoke, Va.
- Ways, C. E., General Freight Agent B. & O. R. R., Baltimore, Md.
- Weir, L. C., President Adams Express Company, New York City.
- West, D. Pinkney, Baltimore, Md.
- White, Albert C., General Superintendent Providence Telephone Company, Providence, R. I.
- Wiggs, Paul R., Chief Clerk Western Union Telegraph Company, Jacksonville, Fla.
- Williams, W. F., Train Master, Raleigh, N. C.
- Wilson, A., Jr., Superintendent C. & P. Telephone Company, Baltimore, Md.
- Wilson, Wm. B., Superintendent Transfer Penna. R. R., Philadelphia, Pa.
- Wood, Chas. F., Western Union Telegraph Company, 83 State street, Boston, Mass.
- Wood, Orin S., Rosebank, Staten Island, N. Y.
- Wood, Otis E., Sec'y and Treas. Five Counties Fire Insurance, 41 E. State street, Ithaca, N. Y.
- Woodford, M. D., President C. H. & D. R. R., Cincinnati, Ohio.
- Woolverton, Wm. H., President New York Transfer Company, 1323 Broadway, New York City.
- Wright, E. P., care of Goff Kirby Coal Company, Cleveland, Ohio.
- Wright, W. S., The United Press, Washington, D. C.

Wynne, Robert J., Correspondent, 511 Fourteenth street N.W.,
Washington, D. C.

Yeakle, J. B., Superintendent American District Telegraph, 13
N. Eutaw street, Baltimore, Md.

Young, N. R., Western Union Telegraph, Washington, D. C.

Young, Wm. H., Night Manager Western Union Telegraph,
Washington, D. C.

Ziegler, Richard B., Superintendent Fire and Police Telegraph,
106 State Street, Harrisburg, Pa.

A draft of a constitution which had been suggested by
Franklin L. Pope, Charles A. Tinker, J. F. Wallick, and
others, was submitted, carefully considered, section by section,
and after full discussion and some amendment, was adopted:

CONSTITUTION.

TITLE.

The name of this organization shall be THE TELEGRAPHIC
HISTORICAL SOCIETY OF NORTH AMERICA.

OBJECTS.

Its objects are the collection, preservation, discussion and
publication of information relating to the history, progress and
development of the electric telegraph in North America, and of
persons who are or have been connected with it.

MEMBERSHIP.

Any person of good repute who is or has been engaged in or
identified with the construction, management, or operation of
the electric telegraph, may be admitted to membership in this
Society as provided by this Constitution.

No initiation fee shall be required. The regular dues shall
be two dollars for each calendar year, payable in advance. The
regular annual dues of two dollars shall be paid by members

admitted during the first half of any calendar year; those admitted during the second half of any calendar year shall pay one dollar as their dues up to the beginning of the next following year.

Members may be admitted by vote of the Society, and the Executive Council shall have authority to admit members at any time when meetings of the Society are not in session.

Applications in writing, accompanied by the first payment of dues, shall be filed with the Secretary, and must be approved by the Council before the applicant is admitted. All members shall be admitted on the same conditions and have the same standing in the Society.

Any member who shall not pay his dues for two successive years shall be reported to the Executive Council by the Secretary, and, after proper notice to the delinquent, the Council may discontinue his membership. The Association shall have authority to expel a member for cause at any time.

OFFICERS.

The officers of the Society shall be a President, a first Vice-President, a second Vice-President, a third Vice-President and a Secretary and Treasurer, who shall be elected at the regular annual meetings to serve for one year, or until their successors shall have been elected and qualified. The offices of Secretary and Treasurer may be filled by one person. In addition to the above-mentioned officers there shall be four directors. The regular officers and directors shall constitute an executive council, which shall exercise such authority and perform such duties as are fixed by this Constitution and such as may be given it by the Society. The Council may fill any vacancies in its Board, except in the office of President.

The terms of office of the persons elected at the first meeting of the Society shall expire on the date of the first regular annual meeting, provided their successors are then elected.

The duties of the officers shall be the usual duties pertaining to the respective positions, and such as are fixed by this Constitution and assigned by the Society. The President shall have the general direction of affairs of the Society. He shall be the chairman of the Executive Council. In case of the

absence or disability of the President his duties shall devolve upon a Vice-President, according to seniority.

The Secretary shall keep accurate records of the proceedings of all meetings of the Society and the Council, issue notices, conduct the correspondence and attend to such other duties as may be assigned to him. He shall be the custodian of all the records, archives and historical collections belonging to the Society. He shall make written reports at each annual meeting and at such other times as may be directed.

The Treasurer shall receive and disburse all the funds of the Society, keep accurate accounts of the same, and report to the Society at the regular annual meeting and at such other times as may be directed. The funds of the Society shall be deposited in a bank to be designated by the Council, and disbursements shall be made only by check signed by the Treasurer and the President, or a Vice-President acting for him.

MEETINGS.

The regular annual meeting of the Society shall be held on the first Wednesday in May of each year, and in Washington, D. C. Special meetings may be called by the Executive Council, to be held at any time after thirty days' notice has first been sent to the post-office address of all members. At all regular and special meetings of the Society the members present shall constitute a quorum. This Constitution may be altered or amended by a majority vote at any meeting of the Society.

A verbal communication was received from Dr. G. Brown Goode, Secretary of the Smithsonian Institution, tendering his best wishes for the success of the Society, and offering to provide a place in the National Museum for any telegraphic relics, etc., which the Society or any of its members may wish to place on exhibition there, to remain so long as the arrangement may be mutually satisfactory. The Secretary was instructed to express the appreciation of the Society for Dr. Goode's courteous message and to accept his offer.

Mr. Marean, from the Committee on Nominations, presented the following report :

The committee appointed to select names for the officers of this organization beg leave to submit the following nominations :

For President : Alonzo B. Cornell, of Ithaca, New York.

For First Vice-President : S. H. Kauffmann, of Washington, D. C.

For Second Vice-President : William B. Wilson, of Philadelphia.

For Third Vice-President : Thomas D. Lockwood, of Boston, Massachusetts.

For Directors : J. H. Emerick, New York ; B. F. Dillon, Jacksonville, Florida ; William R. Plum, Chicago, Illinois ; J. Q. Mason, Tacoma, Washington.

(Signed) M. MAREAN,
GEORGE C. MAYNARD,
HENRY A. REED,

Committee.

MR. MAREAN. I desire, on the part of Mr. Reed and myself, to submit the name of George C. Maynard, of Washington, D. C., for the office of Secretary and Treasurer.

The members nominated by the committee were unanimously elected.

Resolutions, duly made and seconded, were adopted as follows :

That the President be authorized to make such plans for carrying out the purposes of the Society, and to appoint such committees to serve until the next regular meeting as he may deem expedient.

That a copy of the Constitution adopted at this meeting be sent to each member, with a request for suggestions of desirable amendments, and that the President be authorized to appoint a committee of three members to consider and report upon proposed amendments at the next meeting of the Society.

Mr. Maynard explained that all expenses connected with the organization of this Society up to this date had been paid out

of a balance of a fund contributed several years ago by the telegraphers of Washington, Baltimore and Richmond for the entertainment of the members of the Old Time Telegraph Association and the Military Telegraph Society at their annual reunion of 1891, and that this Society, therefore, starts free from debt.

A vote of thanks to the subscribers to this fund and to the Washington Board of Trade, for its courtesy in granting the use of its rooms for this meeting, were adopted, and the business of the meeting having been completed the Society adjourned.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

CIRCULAR No. 1.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

CIRCULAR No. 1.

FEBRUARY 1ST, 1895.

ISSUED BY DIRECTION OF THE PRESIDENT.

Suggestions to members regarding ways of carrying forward the purposes of the Society as defined by the Constitution, (page 24).

Formal papers on subjects relating to telegraphic history and sketches of personal experiences are very desirable, and it is hoped members will furnish them as soon as practicable. While it is not expected that every member will immediately prepare such a paper, each can aid in the work in some of the ways suggested by the following memoranda, which indicates some of the Society's needs.

1. ADDITIONS TO ITS MEMBERSHIP. Blank applications will be supplied to members, or sent direct to addresses furnished by them to the Secretary.
2. Books, pamphlets, telegraphic newspapers, newspaper clippings, manufacturers' catalogues of instruments, and other publications relating to telegraphy.
3. Manuscript documents, records and letters, or copies of such papers.
4. Old tariff sheets and books, message blanks, envelopes, and other forms issued by telegraph companies.
5. Telegrams having historical interest as showing methods of transacting the business, or as referring to important events.
6. Lists or catalogues of books, relics, etc., in the possession of public institutions or private individuals.
7. Books or other publications, on any subject, written by members of the Society, or by any telegrapher.

8. Business cards, catalogues, etc., of members.
9. Photographs and autographs of telegraphers. One portrait of such persons representing them as they commenced the service, and others of later dates are desirable.
10. Photographs of telegraph offices having historical association, or representing important stages in the history of the business. Exterior and interior views of the principal offices of the present time, including ocean cable stations at their American and foreign termini. Interior views should show officials and employees at work, and be marked with their names.
11. Photographs of city and country lines of all descriptions, showing forms of construction, past and present.
12. Photographs of telegraphic construction in progress.
13. Maps of telegraph lines.
14. Instruments, batteries, insulators, specimens of wires, submarine cables, etc.
15. Cuts, drawings, or other illustrations of such instruments, or descriptions of them.
16. Description, and address of owner, of any paintings or daguerreotypes by Morse, with photographic copies of the same.
17. Addresses of persons having in their possession anything of interest to the Society.

Any of the articles referred to can be sent to the Society as a gift or as a loan, or they can be placed on exhibition in the Smithsonian Museum, subject to the order of the owner. Articles for deposit in the Smithsonian may be sent to the Secretary, who will return official receipts to the owners.

Contributions from persons who are not members of the Society are solicited.

Suggestions on any points pertaining to the interests of the Society are especially desired.

GEORGE C. MAYNARD,
Secretary.

800 H STREET N. W.,
WASHINGTON, D. C.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

CIRCULAR No. 2.

APRIL 10, 1895.

The first regular annual meeting of this Society will be held May 1, 1895, in the Board of Trade Rooms, No. 1410 G Street, N. W., Washington, D. C. The first session will open at 10 A. M., when the routine business will be transacted. At a later session, in the afternoon or evening, formal papers will be read and discussed.

Officers will be elected for the ensuing year and other important business will be transacted.

An address will be delivered by President Cornell, and papers on interesting subjects will be presented by members of the Society.

An exhibit of Telegraphic relics, rare books, portraits, etc., will be made.

Attention is invited to the suggestions contained in Circular No. 1, issued February 1st, and all members are urged to aid in advancing the interests of the Society.

Members are requested to notify the Secretary whether they will be present, and they are at liberty to invite persons interested in the objects of the Society to attend this meeting.

GEO. C. MAYNARD,
Secretary.

NO. 800 H STREET N. W.,
WASHINGTON, D. C.

ANNUAL MEETING
OF
THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

HELD AT WASHINGTON, D. C., MAY 1, 1895.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

The Society met at 10 A. M., May 1st, 1895, in the rooms of the Washington Board of Trade, 1410 G Street N. W., and, in the absence of the President and First Vice-President, was called to order by the Second Vice-President, Mr. Wm. B. Wilson, who presided during the session.

The Secretary of the Board of Trade, Mr. John B. Wight, cordially extended to the Society the free use of the rooms and the assistance of his clerks, which courtesy was gratefully acknowledged by the Chairman.

Present:

WILLIAM B. WILSON, of Philadelphia, Pa.
J. B. AUSTIN, of Washington, D. C.
WILLIAM H. YOUNG, of Washington, D. C.
JOHN B. TALTAVALL, of New York City.
HENRY A. REED, of Poughkeepsie, N. Y.
M. W. BARR, of Washington, D. C.
EDWARD LIND MORSE, of Lakewood, N. J.
MORELL MAREAN, of Washington, D. C.
JAMES H. KING, of Washington, D. C.
FRED W. ROYCE, of Washington, D. C.
A. G. SAFFORD, of Washington, D. C.
A. B. TALCOTT, of Washington, D. C.
JAMES J. CLARK, of Forest Glen, Md.
J. B. YEAKLE, of Baltimore, Md.
GEORGE C. MAYNARD, of Washington, D. C.

The minutes of the last meeting, having been printed and distributed to the members of the Society, were not read.

The following letters, from the President of the Society and others, were read:

NEW YORK CITY, April 29, 1895.

MR. GEO. C. MAYNARD,
Secretary of the Telegraphic Historical Society,
Washington, D. C.

MY DEAR SIR: Until now it has been my full purpose and expectation to be in Washington on Wednesday to take part in the proceedings of the annual meeting of the Telegraphic Historical Society. To-day it has become my imperative duty to be here at noon on Wednesday, and I am therefore most reluctantly obliged to forego the trip to Washington, and I write to advise you of the necessity of providing a presiding officer for the meeting of the Historical Society, for that occasion.

Will you kindly make my apology to the members present on account of my necessary absence, and assure them of my full and increasing interest in the progress and prosperity of the Society.

Yours most respectfully,

ALONZO B. CORNELL.

WASHINGTON, D. C., April 25, 1895.

GEORGE C. MAYNARD, Esq.,
Secretary Telegraphic Historical Society,
Washington, D. C.

MY DEAR SIR: I very much regret that a business engagement in New York at that time, from which I cannot well be released, will prevent me from attending and participating in the proceedings of the meeting of the Telegraphic Historical Society, to be held in this city on Wednesday next, the 1st proximo.

I hope the attendance will be large, and that those present will take an active part in promoting the ends the Society has in view, for I feel sure the outcome of a proper spirit in a body

of gentlemen so intelligent, scattered over so wide an extent of territory, and covering such wide experiences, cannot fail to be not only interesting but highly valuable, and not alone to the fraternity of telegraphers, but to students of history generally, and particularly to those engaged in following the wonderful scientific and material developments of the last six or seven decades of the present century. I feel sure, therefore, that every member can contribute something to this end, either in material objects connected with the rise and progress of telegraphy, historical facts, or personal experiences, with a general result that will be at once surprising and gratifying.

As an indication in this direction, I beg the Society to accept the accompanying proof impresssion photo-lithograph of a painting of some historical importance, which, though painted to commemorate another event, will nevertheless have considerable special interest for telegraphers, for its portraiture of Prof. Morse and his telegraphic instrument, as they appeared at the period represented.

I also transmit herewith, for the archives of the Society, the letter written to me by Mr. Frank B. Mayer, the painter of the picture in question, which gives his recollections of some of the circumstances attending the transmission of the first message sent by electricity. With great respect,

Very truly yours,

S. H. KAUFFMANN.

ANNAPOLIS, 11th April, 1895.

S. H. KAUFFMANN, Esq.

MY DEAR SIR: I see by the "Star" that you are interested in the "Telegraphic Historical Society." I recall distinctly the opening of the line to Washington and the impatience with which as a boy I rushed from school the first day (I believe) that the great experiment was tested to see the working of the wonder. The operator's room was on the second story facing Pratt Street, roughly fitted up for the purpose, and I found

there a noted Senator, Dixon H. Lewis, of Alabama, the largest man who probably ever sat in the Senate, deeply interested in testing the reality of the invention. He had come over from Washington to Baltimore to assure himself that no collusion was used in the reputed messages! The messages were on slips of paper, punched with holes and lines which constituted a telegraphic alphabet. In a large picture I painted for the Directors' Room of the Baltimore & Ohio R. R. representing the Founders, etc., of that organization, I have introduced the figure of Morse and his first telegraphic instrument, both the portrait and instrument from data of that date. Portraits of Morse of that period are very rare and I relied on a bust of him I found with the National Academy of Design, New York, of which he was President. I knew him subsequently in Paris as an old man. In the group of B. & O. figures is also Peter Cooper, Ben Latrobe, Gen. McNeill, etc.

I have a few proof impressions of a good photo-lithograph of this picture of which I have sold nearly all the *one hundred* printed at \$5.00 each. If you desire one for the society I shall be glad to supply you.

Very truly yours,

FRANK B. MAYER.

ANNAPOLIS, 17th April, 1895.

MR. GEO. C. MAYNARD,
Washington, D. C.

MY DEAR SIR: In reply to yours of the 14th, the location of the first telegraph office in Baltimore was in the second story, front room, of the first Baltimore & Ohio R. R. passenger station, on the south side of Pratt Street, west of Light Street, now occupied by Mason's Cracker Bakery. The instruments were placed near the window overlooking Pratt Street, whether in the center room over the archway or towards the east end, I cannot say positively, but one or the other. A rough wooden rail divided the room and on it Senator Lewis

was leaning his immense bulk and very intently watching what I presumed to be his test of the *reality* of communication with Washington by sending his own message.

It must have been the first or second day of operation as I hurried from school after hearing of the success of the new telegraph. I cannot give the date. It could be found in a file of the Baltimore "Sun."

I was much interested in all inventions at that time and remembered that I often stopped before a window of Dr. Thos. Edmondson's residence to watch a constantly revolving wheel driven by an electro-magnet, which he had constructed; probably one of the first electric motors which had been constructed. He was a gentleman of wealth who devoted much time to science, horticulture and art.

Some interesting facts in regard to the application of Morse to use the B. & O. line were given by J. H. B. Latrobe and narrate the opposition of a prominent director, whose conscience would not permit him to encourage a "crank" in a ridiculous scheme which could only lead to his ruin and permanent insanity. Whether this statement was given in a paper before the Maryland Historical Society or a communication to the "Sun" I do not remember.

Very truly yours,

FRANK B. MAYER.

BOSTON, MASS., April 24, 1895.

GEORGE C. MAYNARD, Esq.,

Secretary, Washington, D. C.

MY DEAR SIR: I have strong doubts about my ability to be in Washington next week, as I have not long been returned from Chicago, where I have been at work for four weeks, and as the work of my office is, therefore, far in arrears.

If not, I shall greatly regret my unavoidable absence, and as I shall not know until the last minute, I cannot write the

orthodox expressions of sorrow, and must trouble you to state them for me, from the facts you find recorded or implied here. I send you my paper in case I cannot come.

It is to be said, and no doubt will be said, that it does not say a word about American Telegraphic History. This is accounted for in the paper itself—by the fact that a foundation is highly necessary to a building; and that if I survive to the next, and the next, etc., meetings, I shall hope to reach not only the earlier but many other stages of Telegraphic History.

I hope the proceedings and papers in full will be printed and purchasable, and I am,

Faithfully yours,

THOMAS D. LOCKWOOD.

The report of the Secretary and Treasurer was presented and accepted. The following is an extract from the report :

“In the six months since this Society was organized, it has proved its right to existence. It grew out of a general realization of the fact that some steps were necessary to save from loss or destruction much important information and many valuable relics, and the undertaking at once enlisted the sympathy and active co-operation of many telegraphers.

“The developments of the last few months have shown that the opportunities for useful work are vastly more extensive than the most sanguine friends of the Society ever anticipated. From every hand there have come assurances that the establishment of a depository for historical telegraphic documents was the one thing needed. In the short time since the organization and objects of the Society were made known, quite a quantity of valuable historical material has been received, while promises of still larger contributions have been numerous. A list of the objects and contributors will be published. * * *

“The present membership of the Society is 265. Since its organization it has lost two members by death.

“Charles Peterson, of Honesdale, Pa., died February 6th, 1895. Mr. Peterson was the Superintendent of Telegraph of the Delaware and Hudson Canal Co., at Honesdale, Pa. He was a native of Copenhagen, Denmark, where he was born November 15, 1826. He came to this country in 1851, and for some years was engaged in the watchmaking business, which he learned in his early youth. In 1856, he became interested in the telegraph business on the old Cornell line, running through central Pennsylvania. In 1862 he built the first line for the Delaware and Hudson Canal Co., from Honesdale to Rondout, N. Y., and was in charge of the telegraph department of the company up to the date of his death.

“Charles M. Heaton, Sr., of Washington, D. C., died April 29, 1895. He celebrated his ninetieth birthday about two months ago. His telegraphic service commenced April 7, 1848, on the Erie and Michigan Line, at South Bend, Ind. In regard to the construction of that line and the commencement of his work he wrote: ‘This line was the first ever built west of Detroit. It was commenced at each end, at the same time, and connected near South Bend. After it had been built from Milwaukee to Michigan City, I went to the latter place to learn how to do the work, but could practice in the evenings only. I remained one week, during which time I made drawings, showing how the instruments were connected with the wires and the local battery. As the company furnished me with a set of instruments, which I found at home when I returned, I at once set them up, including a local battery, and had at least two weeks practice before the wires were connected. Those instruments I still have.’ In 1861 Mr. Heaton entered the Government service, in the General Land Office in Washington, which he continued for twenty-seven years. More recently he has been incapacitated by ill health for active work.”

“The total cash receipts to date amount to \$302.00. This sum is made up of payments of membership dues, \$2, covering the period ending December 31, 1895.

The expenditures have been as follows:

Stenographer's Report,	\$ 25.00
Typewriting,	6.60
Postage,	50.00
Letter Book, paper, etc.,	6.90
Printing,	95.25
Frame, Morse pictures,	3.25
Stationery,	1.35
Envelopes,	1.60
Rubber Stamps,	4.75
400 copies of "Evening Star,"	8.00
Incidental expenses,	9.42
	<hr/>
Total,	\$212.12
Balance on hand,	\$ 89.88

"All funds received have been deposited in the West End National Bank, and all disbursements have been made by check, signed by the Treasurer and a Vice-President, as required by the rules of the Society."

By vote of the Society, the Chairman was instructed to appoint a committee of three to nominate officers for the ensuing year, and Messrs. Reed, Marean and Maynard were appointed as such committee.

Subsequently Mr. Reed reported that inasmuch as the present officers had held their positions but a few months, and as they all seemed to very much interested in the Society, the committee recommended that they be re-elected. The report was approved and all the officers were re-elected.

The following paper was then read :

THE PATERNITY OF THE AMERICAN ELECTRIC
TELEGRAPH.

BY HENRY A. REED.

An ambitious young man once asked a philosopher what was necessary for him to do in order to become a gentleman. The answer was that the first and one of the most important things to do was to be sure of a good ancestry. However this may agree or disagree with our democratic ideas when applied to individuals, I think we all feel the importance of getting as near the origin as possible when we undertake to write history or to furnish material for future historians.

When Professor Morse first told his friends that he had conceived of a plan of recording language at a great distance and was working out the details, most of them thought him a dreamer and some thought him crazy.

When later he convinced them that his instruments would really talk and write at a distance most people who saw the feat called it a miracle, an inspiration, a revelation, which had been handed down to him as was the law unto Moses.

Later still, when the science was developed so there seemed to be glory and money in it, those who were anxious to share in this part of the game began to cry, "On what doth this, our Cæsar, feed that he hath grown so fat," and on finding that instead of making the thing out of whole cloth, or by necromancy as had been suspected, he had really taken advantage of different scientific developments, they cried fraud, and there seems recently to be a revival of that cry of fraud. We notice here that in the lunacy period it was *Morse* who was crazy, and at the later period none seem to have claimed a share in the revelation. Most of those whose attention was called to the idea ridiculed it, but when the dollar age arrived there came with it swarms of "I told you so's," and of people who could have set that egg on end.

With the achievement of success the charge of lunacy vanished and with those who desired a share or the whole of the glory and remuneration the theory of inspiration was scouted and little has been heard of either theory since, but it is the purpose of this paper to endeavor to sustain the inspiration charge.

In this undertaking I have thought best to trace Inspiration to its origin in order to get at its real meaning. In this effort I have met an obstacle very frequently encountered but easily overcome by our theologians and Bible critics. This obstacle is misinterpretation and I get out of the dilemma in the usual way by changing the interpretation to suit myself.

Now I don't know any more about Hebrew than Moses did about Morse (his alphabet I mean) but I cannot believe that any man who had been so greatly benefited by labor as had Moses, could consider it a curse, and the idea that he who was inspired to write "Honor thy father and thy mother" could ever have intended that all succeeding generations should curse their common mother, whom it seems to me of all created beings, next to the Divine Human, has the greatest claim upon our respect and adoration, I will not believe. Therefore I ask you to look at Moses' picture of the Garden of Eden through a different lens from that commonly used.

We see our first parents placed in this world after it had been fully prepared for them, flowers in full bloom, fruits ready ripe, everything desirable to eat and drink and at first not feeling the need of anything to wear.

This was a condition to suit a lazy man and we have no evidence but Adam was satisfied; Eve, however, had an inspiration.

She saw the tree of science in the Garden. The fruit, even on the lowest limbs, could not be plucked without effort and the higher she looked the finer was the fruit. The more she looked at it the more she longed for it and she said unto Adam, "Behold the fruit on the tree of knowledge is placed high above the reach of the beast, and must be designed for

man for He who hath made this beautiful world hath made nothing in vain." Adam probably suggested that it required effort, but she determined to have that fruit even if she had to climb for it. This was the first inspiration and it meant work. It was an immaculate conception of our good mother Eve and if she saw between her and the fruit on the top of that tree of knowledge, all the misery and woe which was to fall upon her race and decided, notwithstanding it all, that she would be the mother of men rather than of angels without wings, then do we not see in her not only the elements but the development of the highest heroism. And can we not believe that she was able to see through all this mist of misery the rainbow of promise, and that she had faith that He, who had inspired her to labor for knowledge and truth, would eventually reward her with the victory, whatever obstacle might have to be met? Thus were faith and hope brought into the world to sustain labor, and we find that *work*, instead of being a curse, was designed to be the weapon of man's warfare, the developer of all progress; and every human being who by honest effort from that day onward, did little or much towards the development of truth or the elevation of mankind so that the want of a telegraph was felt, or existed without being felt, deserves their mete of praise and Professor Morse is their debtor, for the labor of him who fells the trees of the forest and clears the ground for the plowman is as necessary for the success of the harvest as that of him who sows the seed or reaps the grain, and no great invention can succeed until the world is prepared for it.

More particularly is Professor Morse indebted to all those scientists from Thales to Faraday, who, by investigation and experiment, developed the science or rather human knowledge in the science of electricity; to those from Galvani to Daniells and Grove, who invented and improved batteries to the point of practical usefulness, and to the long line of mechanical inventors from Tubal-Cain to Vail, through whose efforts he was able to get the necessary machinery to apply his invention.

In history we have thousands of people chronicling events and philosophising on their causes and effect, but the great historian must be a great philosopher. He must understand thoroughly not only all contemporaneous, but previous events, and the character and aims of the actors and must have the rare faculty of comparison and of combination in order to give us a comprehensive word picture of any period in the world's progress.

Many authors and poets have given us vivid pictures of different parts of the ground covered by Milton's *Paradise Lost*, but nothing ancient or modern compares with it in comprehensiveness of all the branches of his subject, or in the style or language used in its portrayal. Shall we say because in the preparation of that great poem Milton made himself familiar with all previous literature and with legends of all nations and tribes upon his subject and used all the desirable material therein contained, that Milton was not the author of *Paradise Lost*?

Most of Shakespeare's works might be said to be the rehashing of old stories or of history written by others, except that there is no hash in them. It is true that he obtained the germs of his ideas from old legends and real history. It is also true that in order to paint his living pictures of human nature so strongly and beautifully that every man could see in them his own failings and still admire the pictures, he made himself sufficient master of all languages, living and dead, to draw from them and to coin from them whatever best suited his purpose, and thereby added to the English language several thousand most expressive words. With this preparation he produced his matchless writings which may truly be called works. Well might Ben Johnson say in his eulogy that "Poets are made as well as born."

Read the history of architecture. See how it is advanced by each generation standing, as it were, upon the shoulders of the preceding. Observe also how many clever workmen and often artists of great repute are employed in constructing and

decorating our great buildings, and yet do we not correctly give the credit for the building to the architect who designs the structure and directs the details.

Thousands of people can paint pretty pictures. Our cameras will copy a single expression, but it requires high art, capable of mixing paints with imagination and brains, to paint a great landscape, a historical piece or a real portrait which shall show all the character there is in a man.

By these references we observe that there is a great difference between the painter and the artist, the writer and the great author, the builder and the architect and (without wearying you with illustrations) between the general and the great commander. There is the same difference between the scientist and the mechanic, even though possessed, as they must be, with some inventive genius, and the great inventor.

Each of the former follows certain lines of development with more or less success, but the great inventor, conceiving an idea, which, if carried out, will benefit humanity, makes himself familiar as possible with the principles and details of all branches of science, art and mechanics necessary for its development. If there be links lacking he seeks the men best able to supply them, until by collecting and collating and combining all the knowledge of others he presents the world with the results of his labors, as the architect does with the great building which he has planned although the labor has been done by others. Now, Professor Morse never claimed to have invented electricity, or batteries, or magnets, or clock-work; what he did claim was that he invented the system of telegraphy by which intelligence was first recorded at a distance.

Where there is doubt as to the truth of evidence circumstances must be considered, and in considering the probabilities here, let us go back to Professor Morse's ancestry—to determine what's in the name.

Taking up Appleton's American Biography we find that Abner Morse was an eminent geologist and naturalist; David Appleton Morse, a noted surgeon and specialist in nervous dis-

eases and insanity; Edward S. Morse, one of our foremost naturalists and inventor of apparatus for utilizing the sun's rays for heat and ventilation; Harmon Northrup Morse, professor of chemistry; Henry Dutton Morse, the founder of diamond cutting industry in America; several others are mentioned as eminent in science, law and diplomacy.

Therefore, if we are asked "What's in a name?" we can answer, "There is science in the name of Morse."

Professor Morse's father was an eminent orthodox minister, and when all Boston seemed to be letting go the faith he stood firm and defended it with great earnestness and power. He was also not only a teacher, but an inventor, for when he found the standard geographies too ponderous for his pupils, he made one to suit their requirements, and by preaching and teaching helped his sons all he could towards the higher education which they all sought and obtained.

After working himself through college and saving some money by painting portraits, Professor Morse went to England to study art, and was associated with such men as West, Leslie and Allston.

He soon undertook to paint a picture of the death of Hercules, life size. The clay model which he prepared to paint from, instead of being made a skeleton or outline as many would think sufficient, was executed with such care and detail that West induced him to send it to the Society of Arts, where in May, 1813, he was presented with the gold medal as first prize in sculpture.

Morse's painting made after this plaster cast is placed by art critics in the very highest class. We will not follow his career as an artist. I have referred to this to show that he had in his training for art developed the qualities necessary for an inventor.

He did not make the clay used in his model but he selected it. He probably had some Sullivan or Corbett to pose for the muscles of his model, and he may have taken from former compositions the expressions of anguish conquered by fortitude,

and from all attainable sources the other necessary material, but the Dying Hercules was his invention and his work.

Now it seems that on his way home from Europe in 1832, on the ship Sully, reference was made to recent experiments with electric currents, and of efforts made to convey intelligence by their agency. Professor Morse became very much interested, and with his usual energy gathered all the information possible from his companions, and racking his brain to call up whatever knowledge of the subject was stored there, found enough on which to formulate a plan for a recording telegraph.

I do not propose to weary you by referring in detail to the building up of that plan. Although on account of want of funds and other discouragements, it was five years before his apparatus was presentable, he described in detail to friends in 1832, all the important parts, points and principles of the invention, and as before intimated, his training as an artist, his untiring energy, his great pluck, sustained by the thought of the great benefit the invention would be to the world, helped him through.

As a landscape artist he could take strength from the mountain crag, sentiment from the lover's bower, beauty from the babbling brook, grandeur from the rising or the setting sun, and combining them, produce a comprehensive picture. As the portrait painter he must study his subject under different circumstances and in a variety of moods, to show his full character on canvas.

In order to perfect his telegraph he must get all he could from scientific development up to that time. He converted the movements in signal telegraphy into dots and dashes for his alphabet. He used the best batteries and magnets he could find to obtain and control the necessary power. He used some old clock works to move his paper, made blocks in shape of type to make and break the current. Whether this crying need for better material hurried the improvements in magnets and batteries or not, they came in good time and he made good use of them.

The greatest difficulty was to get somebody to have a little practical faith in his invention and in this he at last succeeded. Alfred Vail had been employed as mechanical expert to improve the clock work and other apparatus. He became interested and was satisfied that there was something in it. This moral support was as helpful to Morse as was the money Vail induced his father to invest and Morse is really as much indebted to Vail as the first man really able to appreciate his great invention, as for the much needed assistance received from him in placing it before the public.

The right of Morse's claim was soon tried in the fiery furnaces of the law which destroyed his purse, but not his faith, and although assailed from many quarters by able counsel backed by rich corporations, his claims were sustained by our Courts, and by the whole of Continental Europe. He was refused a patent in England on technical grounds, but the last edition of the Encyclopedia Britannica, referring to different English inventions says that they appear to have been preceded by that of Morse.

When after all litigation had ceased and Cyrus Field formed a company to span the Atlantic, Professor Morse was engaged with the most celebrated electricians of England to work out the problem ; in every court in Europe he was received with great honor and received from them various tokens of esteem. And when the statue of Franklin in Printing House Square, New York, was to be unveiled, Professor Morse was selected as the most appropriate man in the world to pull the string. The Professor was sick in bed at the time, but he could not forego the pleasure and the honor proffered, and with a nerve trained from youth to obey his will, and a will only death could conquer, he accepted the invitation. He was taken from his bed to the statue. Supported by friends he drew the cord which removed the veil, was carried back to his bed, and in a few days was taken to his long home.

I cannot close without referring to the scope covered by his inventions and the degree of perfection to which they were brought before he left them.

One of his first ideas of having a pen fed with ink move upon paper to trace the signals is now used in the syphon recorder on our cable lines. The Wheatstone instrument with the current closed and opened mechanically is similar to his closing and breaking by type. In a very early stage he got Professor Draper to help him prepare a fluid to saturate the paper to mark the letters by chemical change as in the Bain and Wheatstone systems. He tried the keyboard similar to that used in the House and other printing instruments. It is wonderful that he seemed to conceive of almost all the plans since tried, and adopted that one which is still considered best for most purposes. This seems to support the inspiration theory even in the usual understanding of the term.

But his victory came not by chance. It was won by indefatigable labor, perseverance and faith in his ability to accomplish his purpose.

Gentlemen, there was something in this, our Cæsar to be fed, and if he had discretion in selecting his diet all the better for him and for us who are benefitted thereby. Though he was debtor to all preceding laborers, all who succeed him are largely his debtors.

Following Mr. Reed's address, Dr. Clark said: "I knew Prof. Morse very well. I made for him the first telegraph registers in which all the parts were placed between two metal plates. The earlier instruments were made in several sections, that is, the clock work, the magnets, the standards which supported the pen lever and other parts, were placed in separate frames. The improved arrangement was made according to very beautiful drawings, prepared by J. D. Reid."

Mr. Edward L. Morse presented some very interesting letters written by his father, Professor Morse, and read extracts from his note books and other documents.

The following papers and letters were then read :

THE GENESIS OF THE AMERICAN ELECTRIC
TELEGRAPH.

BY FRANKLIN LEONARD POPE.

Some years ago I was commissioned by the publishers of the *Century Magazine* of New York to prepare for that publication a paper to be entitled "The American Inventors of the Telegraph." To this end a mass of valuable original material was placed at my disposal, much of which had never been printed. Among the manuscripts which I was thus enabled to utilize in furtherance of the work I had undertaken, were many letters written between the years 1837 and 1850, by Samuel F. B. Morse, Alfred Vail, George Vail, Francis O. J. Smith, Amos Kendall, and others more or less prominently connected with the early history of the American electric telegraph. There was also a long written statement by William Baxter, a well known inventor and mechanic, now dead, who was in his youth an employe of the Speedwell Iron Works at Morristown, N. J., where the first practical recording telegraph apparatus was constructed, and who assisted Alfred Vail in his work in developing the earliest apparatus. Much time and labor were devoted to a critical study and comparison of these and other authorities, with a view of throwing, if possible, some new light on certain long-vexed questions in relation to the real authorship of the American, better known as the "Morse" system of telegraphy. The results of this investigation, and the conclusions reached by me in consequence, were embodied in an illustrated article, which appeared under the above named title in the *Century* of April, 1888. These conclusions being in some respects widely at variance with those accepted almost without question by preceding writers upon the history of the art, led, not unnaturally, to no inconsiderable amount of public comment and criticism. It is perhaps hardly necessary for

me to say to the members of this society, many of whom have known me for more than a quarter of a century, that in undertaking this commission I had no object to serve other than to ascertain and state the exact truth, as it should present itself to my mind after a careful sifting of the most trustworthy source of historical evidence, the contemporaneous correspondence of the different persons most immediately concerned in the matter.

So far as I am aware, no serious attempt has been made to controvert the essential facts relied upon in forming the opinions set forth in the *Century* article, with possibly one exception, to which I shall further on take occasion to refer. In fact, so well were most of the conclusions arrived at, fortified by unimpeachable contemporaneous records, that it would be a task of no small difficulty to discredit them. But while, with the exception above noted, there has been little or no controversy over the facts, there has arisen a difference of opinion in respect to the interpretation to be placed upon those facts. It is not seriously disputed at the present day that the contributions of Henry, Vail and Gale each constitute essential factors in the structure and mode of operation of the modern telegraph, and that without the assistance of these scientists and inventors it is by no means certain that success would have finally crowned the unwearied and persistent labors of Professor Morse. The real question at issue appears to me to be this: to what extent ought we to accord to Morse the right to appropriate to himself the results of the labors of his predecessors and of his assistants, and particularly we are to inquire whether the important changes in the original scheme of Professor Morse devised and introduced by Alfred Vail are rightfully to be regarded merely as improvements upon the prior invention of Morse, or as independent and original inventions.

Let us consider in the first place what is the essential principle, the soul as it were, of the commercial telegraph of to-day? I conceive it to consist; *first*, in the co-operative assemblage of the following elemental parts:—(1) a source tending to gener-

ate a continuous current of electricity—(2) a line of conductors extending to and returning from some distant point, traversed throughout its length by such current—(3) a device for alternately interrupting and restoring the continuity of said conductor at will, and (4) a means of rendering evident to the senses the presence or absence of a current in the line of conductors, and *second*, in a method or mode of operation which consists in interrupting and restoring the current in the conducting circuit in accordance with a prearranged code of elemental time-intervals, arbitrarily representing the characters of the English or other alphabet.

When one skilled operator transmits a communication by alternately bringing together and separating the severed ends of a conducting wire in accordance with such an alphabetical code, and another skilled operator receives and understands it by utilizing his tongue for detecting the flow and cessation of the electric current, we have the generic electric telegraph reduced to its lowest terms; in other words, we have the simplest possible embodiment of the primary concept of the invention.

But if we go a step farther, and inquire what are the essential structural elements of the *commercial* telegraph of to-day, we at once perceive that these are likewise four in number, viz, (1) the generator, (2) the line, (3) the transmitting key, (4) the electro-magnet with its movable armature, and (5) the automatically acting retractor for withdrawing the armature from the electro-magnet. But the structure alone is not enough, it must have in addition a method or law of operation, and this is supplied by the bi-signal alphabetical code founded on the immutable basis of time or space. Laying aside for the present all consideration of the actual historical evolution of the telegraph of to-day, it must be self-evident that it comprises nothing more and nothing less than the application to a *specific structural organization* of a *specific law of co-ordinate operation*. Therefore, abstractly speaking, the true inventor of the generic telegraph, as we know it to-day, must be the

person who first applied this particular law or method of operation to this particular assemblage of elements.

Without entering at this time into a lengthy discussion of authorities, it may be sufficient for the present purpose to take the following statements for granted: (a) A generator of electricity, a circuit-breaking device or key, a circuit of conductors, an electro-magnet and an automatically retracted armature were first assembled together in a mutually dependent relation by Joseph Henry, of Albany, N. Y., in 1831.

(b) The same group of elements were a second time assembled together, this time under a specific co-operative law of operation, constituting it an actual electric telegraph for the transmission of miscellaneous intelligence, by Samuel F. B. Morse, of New York, in 1836.

(c) The alphabetical bi-signal code was first applied to the above organization of elements, constituting the generic modern telegraph, at a date between January 6 and January 24, 1838. The question is, by whom was this done?

From his earliest conception of the possibility of an electric telegraph, there is ample evidence that Morse had consistently adhered to one and the same method of transmitting intelligence, that of indicating numbers by groups of impulses representing the nine digits and applying these numbers to the individual words of a dictionary. In his sketch book of 1832 he jots down examples of his proposed scheme, thus:

215	56	15	5
War	Holland	Belgium	Alliance

On October 14, 1837, Morse writes to Vail: "The dictionary now occupies all my time. It is a most tedious, never-ending work. * * * You will be pleased with my plan of a permanent dictionary which I have drawn out ready to show you when I see you." And again October 24, 1837: "The dictionary is at last done. You cannot conceive how much labor there has been in it; but it is accomplished, and we can now talk or write anything by numbers." In the *Morristown Journal*, there was published an account of an exhibition of the new

telegraph at Speedwell on January 6, 1838, in which it is expressly stated that the communication was made by means of numbers applied to words in a dictionary. But the *Journal of Commerce* of January 29, 1838, says: "Professor Morse has recently improved on his mode of marking, by which he can dispense altogether with the telegraphic dictionary, using *letters* instead of numbers, and he can transmit ten words per minute, which is more than double the number which can be transmitted by means of the dictionary." And finally there is now in existence a dispatch known to have been transmitted by Vail on January 24, 1838, in which is employed the identical alphabetical code as that with which every operator of to-day is as familiar as with the Roman alphabet.

William Baxter, who was during this period an assistant of Alfred Vail, in his written statement above referred to, distinctly asserts that the alphabetical code was devised by Alfred Vail, and by him alone, and that the most convenient relative length of the different characters was worked out by him from a study of the type fonts of the local printing office. This, so far as I know, is the only direct evidence that Vail was the inventor of the code, but there is secondary and circumstantial evidence which tends to confirm the testimony of Baxter.

In Scribner's *Hours at Home*, September, 1869, Dr. W. P. Vail, an uncle of Alfred Vail, makes the following allusion to his deceased nephew:

"The birth-time and the birth-place of the telegraph as a recording instrument of intelligence * * * the parties who wrought the rude original plan into working order and gave it efficiency, the man who invented the 'Morse alphabet' (so called), and to whose ingenuity, mechanical skill and tireless perseverance the clock-work of the telegraph machine is largely due * * * all this is well understood and for the most part is written down, and the record some day in the near future must find its place in history, upon the true principle of *sum cuique*."

In response to an inquiry from Professor William B. Taylor of Washington, as to the evidence of Alfred Vail's invention of the dot-and-dash alphabet, Dr. Vail wrote:

“It was so understood by all who were admitted to his intimacy. In a conversation with him shortly before his death in 1859, he so assured me. I am not aware that Mr. Morse ever set up an adverse claim.”

It is certainly somewhat strange, if an assertion like the above, appearing in a widely circulated publication, was untrue, that Professor Morse should never during his lifetime have seen fit to call it in question. He was a skillful and able controversialist, and was usually ready and willing upon all proper occasions to take his own part.

My view of the matter therefore—if we assume it to be true that the alphabetical code, of dots and lines, as distinguished from the numerical or digital code of dots only, was the production of the brain of Alfred Vail—is this:

Morse applied to a certain structural organization already existing in the art a particular *mode of operation*, viz., a numerical code of dots only, and this, together with the addition of a valuable although non-essential recording device, constituted his real invention. Vail subsequently applied to the same basic structural organization another and an essentially novel and distinct mode of operation, and in so doing made an original and independent invention, and this, under the law of the survival of the fittest, has become the universal telegraph of to-day, while its predecessor has come to possess merely a historical interest.

I do not purpose in this paper to discuss the contract relations which existed between Morse, Vail and others during the period in which the Morse patents were in force, which covered the whole remaining lifetime of Alfred Vail, for these, while they furnish an obvious explanation of Vail's reluctance to set up a public claim to his share in the inventions covered by the patents, ought not to be permitted to affect in any way the result of an inquiry into the true authorship of the commercial electric telegraph.

Having shown that the work of Morse, as well as that of Vail, was founded upon a typical structural organization which

had at an earlier date been contributed to the art by Henry, it remains to make reference to one other contribution of the same philosopher, which constitutes the essential feature of the long distance as distinguished from the local telegraph, and without which the main invention would be deprived of its principal commercial value. I refer to the long coil, or as he called it, the "intensity magnet." It is an undisputed fact that until Morse's attention had been called, by Dr. Gale, to the principles expounded in Henry's classical paper of January, 1831, his inability to operate his machine satisfactorily, even through so little as one hundred feet of wire, had been to him a source of great discouragement. Having once possessed himself of a knowledge of the means of overcoming this obstacle, from the published researches of Henry, either directly, or as appears to be the fact, through the suggestion of Dr. Gale, I think he had a most undoubted right to incorporate it into his own invention. I have referred to this matter in part for the reason that it affords me the opportunity to make a "personal explanation" of a matter which, through a perhaps natural misapprehension, has subjected me to much undeserved criticism.

While editor of *THE ELECTRICAL ENGINEER*, in 1889, I had occasion to notice a legal decision, then just rendered in a well-known patent case, involving a contested question of priority of invention of the fibrous carbon filament of the incandescent electric lamp, as between Thomas A. Edison and Sawyer & Man. The line of reasoning adopted by the eminent jurist (since deceased) who wrote the opinion in the case, seemed to me so remarkable—and I may parenthetically observe so fallacious—that I was moved to parody it in an editorial article which appeared in the above journal in November, 1889, and I undertook for this purpose to paraphrase the case of the well-known suggestion by Gale to Morse, in reference to the adaptation of the telegraph to long distance service by winding the electromagnet with fine wire. But the result proved that as a humorous production, my parody was scarcely a success. That the minds of the friends of Professor Morse

may no longer be disturbed by the heretical opinions which have been mistakenly attributed to me, I ask to be indulged in placing in parallel columns the judicial opinion and the offending editorial:—

Extract from Opinion of Mr. Justice Bradley, in *Consolidated Co. vs. McKeesport Co.*, Pittsburgh, 1889.

“ But suppose it to be true, as the supposed inventors, and some of the other witnesses testified, that they did in 1878 construct some lamps with burners of carbon made of fibrous material and of an arch shape, which continued to give light for days or weeks or months, still were they a successful invention? Would any one purchase or touch them now? Did they not lack the ingredient which was essential to their adoption and use? Did they go any further in principle, if they did in degree, than other lamps which had been constructed before?

“ It seems to us that they were following a wrong principle; the principle of small resistance in an incandescent conductor, and a strong current of electricity, and that *the great discovery in the art was that of adopting high resistance in the conductor with a small illuminating surface and a corresponding diminution in the strength of the current.* This was accomplished by Edison in his filamental thread-like conductor, rendered practi-

Extract from editorial in *Electrical Engineer*, November, 1889.

“ But suppose Morse did construct a telegraph consisting of a stylus moved by electromagnetism, which was exhibited in actual operation for days and weeks and months? Was it a successful invention? Would the Western Union Telegraph Company purchase or use such a machine now? Did it not lack an essential ingredient which was necessary to its commercial usefulness? Did he go any further in principle, if he did in degree, than did Henry in 1831?

“ It would seem that he was following a wrong principle; the principle of small resistance in his electro-magnet and a strong current of electricity, and that *the great discovery in the art of telegraphy was that of employing high resistance in the electro-magnet, with a small and a corresponding diminution in the strength of the current required.* This was accomplished by Gale with his filamentary thread-like magnet-wire, rendered practicable by placing of the battery cells in series. With such a battery the slender, filamentary magnet-wire attenuated to the last degree

cable by the perfection of the vacuum in the globes of the lamp. He abandoned the old method of making the globe in separate pieces, and adopted a globe of one entire piece of glass, into which he introduced small platinum conductors fastened by fusion of the glass around them, thus being able to procure and maintain perhaps the most perfect vacuum known in the arts. In such a vacuum, the slender filaments of carbon attenuated to the last degree of fineness, may be maintained in a state of incandescence without deterioration for an indefinite time and with a small expenditure of electric force. *This was really the grand discovery in electric lighting, without which it could not have become a practical art.*

* * * Of course the form of the filament in the receiver or globe may be varied at pleasure; it may be in the shape of a coil or a horseshoe, or it may be wound upon a bobbin. All these forms are old. The principle and great thing described is the *attenuated filament* and its enclosure in a perfect vacuum. There may be a preference of materials from which the filament is made. Practice will evolve all these collateral advantages. We think we are not mistaken in saying, that but for this discovery electric lighting

of fineness, may be made to do its work through a circuit of hundreds of miles with a small expenditure of electric force. This was really the *grand discovery in the art of electric telegraphy, without which it could not have become a practical art.*

“Of course, the form into which the wire is coiled may be varied at pleasure. It may be wound upon a cylinder or a horseshoe or it may surround a galvanometer needle. All these forms are old. The principal and great thing is the *attenuated conductor* and its use in connection with a series of many cells. There may be a preference in the metal from which the attenuated conductor is made. Practice will evolve all these collateral advantages. We think we are not mistaken in saying that but for this discovery, electric telegraphy would never have become a fact. We suppose it to be the discovery of Professor Gale. It may not have been so; it may have been the discovery of Professor Henry. But whoever discovered it, it is undoubtedly the great discovery in the art of communicating intelligence to a distance by electricity. We have given a more detailed account of it in order to illustrate what we mean when we raise the question whether the claimed invention of Morse was

would never have become a fact.

“We have supposed it to be the discovery of Edison, because he has a patent for it; this may not be the case, it may be the discovery of some other person. But whoever discovered it, it is undoubtedly the great discovery in the art of practical lighting by electricity. We have given a more detailed account of it in order to illustrate what we mean, when we raise the question whether the claimed inventions of Sawyer & Man were ever successful. They may have made a lamp that would burn, but was it a success or was it a failure? Did it ever go into use? What was the object of all the experiments made by them and others? Was it not to make an electric lamp that could successfully be used by the public and have a commercial value? Did they succeed in making such a lamp or in finding out the principle on which it could be made? We do not so read the evidence.”

ever successful. He may have made a telegraph that would record arbitrary signs capable of being interpreted. But was it a success or was it a failure? Did it ever go into use? What was the object of all the experiments made by him and others? Was it not to make an electric telegraph that could be successfully used by the public and have a commercial value? Did he succeed in making such a telegraph, or in finding out, until Gale told him, the principle upon which it could be made? We do not so read the evidence? In view of the most recent decisions, Gale and not Morse is the man to whom we are indebted for the art of transmitting telegraphic signals to a sufficient distance to be of any practical utility.”

Without presuming to question the abstract justice of the decision of the Court in the incandescent lamp case, I think it must be admitted that the process of reasoning by which the result was reached by the learned Judge needs only to be applied to the precisely analogous case of the electric telegraph to render its inconsistencies sufficiently apparent, and this, and this only, was the end sought to be accomplished in the article to which I have referred.

In conclusion I would say that I yield to no one in my profound admiration for the genius, the patience, the industry and the unwearied perseverance of Professor Morse. The system of telegraphy which has grown by a continuous process of evolution from his crude machine of 1836, has beyond question proven itself to be the best in the world. Mr. Charles L. Buckingham has aptly said that the work of Morse may be compared to the centering of a massive arch, by which its form, dimensions, and characteristics are determined, and without which its very existence would have been impossible. What though this necessary preliminary structure forms no part of the completed edifice? Is any less honor due to its designer and constructor? Does not the spirit and soul of his work remain even when, its mission having been fulfilled, its crude material embodiment has been cast aside?

THE ELECTRIC TELEGRAPH IN AMERICA.

BY THOMAS D. LOCKWOOD.

In writing history, the main difficulty is not so much where to leave off, as where to begin, for ending at any point which may suit the good pleasure of the historian, it is easy to say "Continued in our next," and easy to take up the broken thread at a convenient season; but having begun too late, it is to say the least incongruous if at a subsequent time we essay to incorporate in the upper stories of a story bricks and stones which are properly a portion of its foundation.

Taliaferro P. Shaffner in his well known "Telegraph Manual" goes back to the prophet Jeremiah for his Genesis of the Telegraph, but I conceive we are showing all necessary respect to history, mythology and legendary lore if we restrict our researches to the Christian Era; and indeed this paper would not consider itself justified in going even as far to the rear as it does, with the inevitable result of bringing within its limits little if anything of American Telegraph, did it not reasonably expect to be followed by others of identical authorship, bringing the subject down the centuries to the present time.

Now while American Telegraphy is our theme, I think we have an undoubted right to regard such part of the Ancient History of Telegraphy as forms the common foundation of the telegraphs of the world, as our foundation also; and that, therefore, the discussion of American Telegraphy from a historical point of view, without any consideration of what underlies it, would be a second materialization of the error made by Morse when in the earlier portions of his career, knowing nothing of the possible work of his possible predecessors, he used to think and speak of his telegraph as being the first one ever conceived; and appeared to believe that he himself was really the first man who had ever compassed the idea of an electric telegraph circuit and apparatus.

Commencing therefore with the plateau of fancy as well as fact, which constitutes the basework of American in common with International systems of Telegraphy, and at the beginning of that, we see as early as A. D. 1558 the dawn of the thought that it was desirable and perhaps possible to achieve the instantaneous and reciprocal transmission of intelligence between points far distant from one another, this suggestion coming in the guise of the mythical "Sympathetic Needle" apparatus, which, though an entirely imaginary instrument, was so fully described and so strongly advocated, or as we would say at the present time "promoted," as to gain a firm hold on the credulousness of the age, which evidently gave implicit credence to "they says," without once endeavoring to find out whether they said truth or not.

The theory of the sympathetic needle telegraph was that if two needles were excited by the same magnet or loadstone, and poised on pivots, every movement imparted in any way to either would sympathetically and instantaneously induce similar movements in the other. If these needles were surrounded by a frame imprinted with the letters of the alphabet, the supposition was that two friends living at a distance from each other could agree upon a particular time for conversation (just as they do now in long distance telephony) and both taking up their dials, either one could manually turn his needle from letter to letter, and thus spell out words, whereupon the needle of the other would follow all these movements and spell out the same words. The direction of transmission it was supposed could be changed at will.

I think that the genius manifested by this conception of the 16th century has scarcely received the meed of appreciation it deserves; but in writing in 1879 the official biography of Professor Joseph Henry for the Smithsonian report W. B. Taylor appears to have reached a full realization of it; and in speaking of the idea employs this remarkable language:

"Among the numerous flights of imagination by which genius has frequently anticipated the achievements of her more

deliberate and cautious sister * * * earth walking reason, none is perhaps more striking than the romantic conception of an intercourse maintained between separated friends by means of two sympathetic magnetic compasses, whereby the indications on the dial given by one, were instantly made visible to the other." (1.)

The idea probably originated with Baptista Porta, a Neapolitan philosopher of some celebrity, who in a book dealing with the wonders of magnetism (2), refers to it at the end of his 21st chapter, saying: "Lastly, owing to the convenience afforded by the magnet, persons can converse together through long distances." At all events this is the first mention I can find of this ingenious idea.

In a later edition (1589) of his book Porta becomes bolder, and says in a preface to his seventh book: "I do not fear that with a long absent friend, even though he be confined by prison walls, we can communicate what we wish, by means of two compass needles circumscribed with an alphabet."

Daniel Schwenter writing in 1600 (3) calls this curious fancy "a wonderful secret which I have hitherto hesitated to divulge," but saying that he "will now communicate it for the benefit of the lovers of science generally," he proceeds to describe it in a Cagliostro-like fashion, specifying in so strict a way, the structural details of the instruments, that one would almost believe he had made them, were it not for the undoubted fact that had he done so he could not have failed to find that the system possessed at least one serious defect, viz., that of inoperativeness.

After a brief season of dormancy, the story acquired a new lease of life, and is next told (4) by Faminius Strada, a learned Italian. His version of it can be found by those who are sufficiently solicitous about it to look, both in Latin and extremely quaint English, in the *Telegraphic Journal*, London, November, 16, 1875, and has before and since that date been referred to by a host of writers, far too numerous to mention by name, but including such well known authors as Joseph Addison (5) and Mark Akenside (6).

Addison writing in the *Spectator*, after referring to Strada, adds something on his account, saying: "In the meanwhile, if ever this invention should be revived, or put in practice, I would propose that upon the lover's dial plate there should be written not only the four and twenty letters, but several entire words which always have a place in passionate epistles, as flames, darts, die, language, absence, Cupid, heart, eyes, hang, drown, and the like. This would very much abridge the lover's pains in the way of writing a letter, as it would enable him to express the most useful and significant words with a single touch of the needle."

Akenside serves up the subject in verse, in this wise:

"Two faithful needles—from the informing touch
Of the same parent stone, together drew
Its mystic virtue—
And though disjoined by kingdoms—though the main
Rolled its broad surge betwixt—and different stars
Beheld their wakeful motions—yet preserved
Their former friendship and remembered still
The alliance of their birth."

In the preface written by Robert Sabine to his work on the Telegraph (7) it is pointed out that the great Galileo considered this matter, and records his views in the guise of a conversation between one Sagredus and a swindler who is offering to sell him the great secret of instantaneous communication.

(8) "You remind me (said Sagredus) of one who offered to sell me a secret art by which, through the attraction of a certain magnet needle, it would be possible to converse across a space of two or three thousand miles. And I said to him that I would willingly become the purchaser, provided only that I might first make a trial of his art, and that it would be sufficient for the purpose if I were to place myself in one corner of the sofa and he in the other. He replied that, in so short a distance, the action would be scarcely discernible; so I dismissed the fellow, and said that it was not convenient for me just then to travel into Egypt or Muscovy for the purpose of

trying the experiment, but that if he chose to go there himself I would remain in Venice and attend to the rest."

These references to the Sympathetic Needle Myth might be largely multiplied, as they are very abundant in literature; but the instances here mentioned are sufficient to show how deep-seated and wide-spread was a belief in the existence of such an apparatus.

A myth is, however, little more than a mist, and as the science of Electricity progressed, the faith in magnetic sympathy waned, and by the middle of the eighteenth century we find that the supposititious telegraph is mentioned no more by authors who believe in its operation, but when at all—only by poets like Akenside, or by the chroniclers of curious ideas.

The electric telegraph in all of its forms, past, present and future—though it can scarcely in the strictest sense be properly termed an invention, since it springs from the accumulated thought and labor of many, yet comprises a large number and variety of inventions, and is the direct outcome of a brilliant series of discoveries and fundamental inventions all practically made between the middle of the last century and the end of the first third of the present century.

An extended description of these is not, of course, to be looked for in an historical essay on Telegraphy, but such an essay would clearly be incomplete were they left totally without notice.

They comprise the discovery of electric conduction and insulation; the discovery of the electro-chemical method of generating electricity and the subsequent devisement of the voltaic battery, first in crude, and later in more perfect form; the discovery of the real relationship between electricity and magnetism, and the development of the compound science of electro-magnetism; the dependent invention of the electro-magnet; and the discovery of the magneto-electric induction rendering possible the future generation of electric currents of great strength by the expenditure of mechanical power.

Not until all of these, except possibly the last, had been accomplished, could there be any reasonable hope of a practical electric telegraph, but immediately after and in consequence of them, and hard on the heels of the last, came the conception, invention and construction of the three earliest practical telegraph systems, those of Morse, Steinheil, and Cooke and Wheatstone; Morse probably being the earlier in conception, while the other two, about contemporary with each other, certainly far outstripped him in execution.

We must briefly, however, consider the fundamental discoveries to which reference has been made.

The history of all forms of electric telegraph begins unquestionably with the first of these—the great, but little appreciated discovery by Stephen Grey, made in 1729, that electricity could be transmitted through wires and cotton threads; but that other substances, such as glass and silk, would not permit of such transfer. Continued investigation made it apparent to Grey that all substances at his disposal belonged to one of two classes, the one like the cotton thread and brass wire, through which the electric excitement could pass, and the other like the silk and glass opposing and preventing such passage.

Thus at so early a time was made the far-reaching discovery of conductors and non-conductors, or conductors and insulators, which discovery is the very keystone of telegraphy, and is found embodied in every electric circuit without regard to its purpose.

The veriest tyro in electric telegraphy knows that the foundation fact of the telegraphic circuit is that the electric current can travel over and through the metal wire, and that it is prevented from leaving that wire and taking a short cut home, only by supporting it at intervals upon insulators, or coating it throughout its length with insulating material.

As we shall subsequently see, with no other source of electricity at hand except the frictional machine, the knowledge of the great discovery of Grey yet inspired many electric telegraphic propositions, of greater or less plausibility; but whatever was the cause then, we know now that any telegraph

devised to be operated by the high potential charges and discharges of the frictional machine and its compeers could not meet with practical commercial success.

But the successful experimentations of Galvani, published in 1791, and of Volta, in 1796, and subsequent years, culminating in the construction by the latter in 1800 of the Voltaic Pile, which was the forerunner of every chemical battery since made, and, as we know, they are almost innumerable, furnished means of obtaining currents of electricity in great quantities, but of a tension or electro-motive force so moderate as to be easily insulated and kept under control; and thus brought science another long step nearer to telegraphy.

But the battery as it left the hands of Volta and his earlier successors could not long sustain its generative power, by reason of the occurrence of a phenomenon, which has (rather unreasonably, I think) been termed "polarization."

This worked in two ways; it covered the surface of the negative plate with bubbles of hydrogen, thereby reducing its surface, and thus raising the resistance of the cell; and it tended to set up an electro-motive force opposite in direction to that of the original electro-motive force.

Now, although the electric telegraph could have been operated by such batteries, to quote from Taylor (9), "frequently renewed (just as a good steam engine may be efficiently worked by an inferior and wasteful boiler)," it is probable that, considering the unstable hold the telegraph had on the public in its incipiency, it might have totally fallen through, and certainly its success would have been delayed had not more constant sources of current been devised by the time the telegraph was ready for them.

And it therefore fortunately fell out that by the beginning of 1836 the relatively feeble but constant current blue vitriol battery was devised by George Frederick Daniell, who in announcing his work to the Royal Society, London, modestly said: "I have been led to the construction of a voltaic arrangement which furnishes a constant current of electricity for any length of time which may be required."

For a long time, as all present are well aware, forms of this battery were in American Telegraphy mainly used to furnish a local current for registers and sounders; although later, in the gravity modifications, it was widely introduced also for main lines.

In 1839, the extremely active battery of Professor (now Sir William) Grove was invented, and became instantly very popular; its high power is attributable to two causes; first, its high electro-motive force; and second, its low internal resistance. Many members of this Society must I am sure cherish a vivid recollection of their early experiences with the Grove battery, which for many years easily held its place as the favorite main battery for American Telegraph Lines; of its proclivity for developing corrosive and choking gases, and of the labor of taking down and cleaning every night which it imposed on the early operator, who had to be a kind of electrical man of all work.

Its low resistance served us well, in that it enabled us, in the later years of its use, to work a large number of lines without interference from the same battery.

The Daniell and Grove inventions embodied the Volta discovery in a commercial and highly efficient form, in which it could be conveniently and economically employed; and when added to what had preceded it, provided three of the foundation stones of successful telegraphy, viz., the conductor, the insulator, and the generator.

For many years prior to 1819 those engaged in studying electrical science were satisfied that in some way there existed a relationship between the two natural forces of electricity and magnetism; but in that year (10) Ørsted of Copenhagen "made the observation that a wire uniting the ends of a voltaic battery in a state of activity affected a magnet in its vicinity."

His discovery in plain terms was that the passing of an electric current through a wire of any material, iron, copper, etc., transformed such wire for the time being into a magnet

with a concentric field. He did not at first see the full significance of the discovery, and did not publish it until July 21st, 1820, nearly a year later; yet this discovery was the beginning of the new science of electro-magnetism; the scientific fact which a few years later expanded into the electro-magnet, one of the most universally employed appliances of electrical research and utilization; and is the base on which securely rests the colossal superstructure of the innumerable applications of electricity to the useful arts, which at this end of the century are at the disposal of mankind.

But when Ørsted did finally get ready to publish his discovery, so ready and receptive was the scientific mind, and so promptly and effectively did results follow, that truly the story told by him of his experiments may be said to have been an embodiment of Byron's noble thought, that

"A small drop of ink,
Falling like dew upon a thought, produces
That which makes thousands
(Perhaps millions) think."

For the great scientific thinkers of the time, Ampère, Arago, Davy and others, seizing the suggestion, made it within an extremely brief space of time, the nucleus of a new, exact and productive science; so perfectly indeed was it reduced to law, that before the year 1820 came to its close, the first galvanometer was devised by Schweigger, who wound a number of turns of covered wire round a pivoted magnetic needle; thus producing the progenitor of the galvanometers of our own time, the beautiful instrument of Thomson; and in fact of the Cooke and Wheatstone needle telegraph, which so long was the characteristic type used in the British Isles and is still extensively employed.

The invention of the electro-magnet by Sturgeon in 1824, was the direct product of the discovery just mentioned, and it was the crowning result thereof.

Sturgeon's magnet (11) had a U-shaped iron core coated with a non-conducting varnish, and was wound loosely with

bare copper, the turns of which, sixteen in number, were, of course, separated from each other. This electro-magnet, when excited by a single voltaic cell having plates of large surface (130 square inches), was capable of sustaining a weight of nine pounds.

This represented the *ne plus ultra* of achievement until the year 1827, when a new and powerful investigator appears on the scene. This is Joseph Henry, of Albany, Princeton and Washington. Much might be said of his masterly researches and conclusions, but for lack of space I must content myself with a bare and simple recital of facts.

Henry's first move (12) was to insulate the wire instead of the iron core of the electro-magnet, and to wind the core with a great many turns of wire; in short, to profit by the hint given by Schweigger in the construction of his galvanometer.

By insulating the wire with silk he was at once enabled to employ a large number of turns, each more nearly at a right angle to the core, than they could be placed in Sturgeon's magnet.

He continued his researches until in 1831 he made an electro-magnet, which weighing with its armature $82\frac{1}{2}$ pounds, was found capable of sustaining over a ton.

He then found that though with a small battery in a short circuit, the strongest attractive power could be provided by winding the electro-magnet with a comparatively small number of turns of wire not very small in size; when the circuit was long the best results could be attained by increasing the number of battery cells, and by winding the electro-magnet with many turns of fine wire.

The logic of this is, of course, that if the electro-magnet wound with a long and fine wire be introduced into the short circuit of the small battery, its resistance being great, weakens the current unduly and to such an extent that it cannot strongly magnetize the core; but if such a magnet wound with a great number of turns of fine wire be placed in the circuit of a battery having a greater number of cells in a long circuit, or as

we should now say a circuit of great resistance, while the current will still be feebler than with the same battery it would be in a circuit of lower resistance, it will be conducted around the iron core a great many times, and can therefore develop a much greater magnetizing effect than could be developed by the same weak current acting through a magnet of few turns.

And this discovery was Henry's second great advance.

It is apparent to every one that these researches and their successful results went far toward hastening the day of those systems of practical telegraphy which employ the electro-magnet, and established a firm base of the subsequently devised combination of main and local circuits which has since 1844 been almost universally adopted; and had Henry contented himself with the two great steps of making electro-magnets with silk-covered wires wound over the core in considerable length, and of discovering and demonstrating the important principle of a proper relation between the resistance of the circuit and the winding of the magnet, he would have earned the gratitude of the human race; for by such discoveries was produced an electro-magnet "which alone is able to act at a great distance from its exciting source, and one which therefore is alone applicable to the uses of telegraphy."

It was an unconscious experimental confirmation and application of the now fully accepted law of Ohm, which shows us that the current in any circuit is directly proportionate to the electro-motive force of the battery; and inversely proportionate to the resistance of the current and that its value is the ratio between the electro-motive force and the resistance; which law had, however, so far failed to attract any notice from the world of science; and was probably at the time quite unknown to Henry.

But this was not all. From the perfected electro-magnet it was but a step to a clear apprehension of its possibilities, and to exhibit these to his classes at Albany; and as early as 1831 Henry constructed a circuit comprising a mile of copper wire conductor, and extending round the walls of an upper room

between a small Cruikshank battery and an electro-magnet having a polarized armature, to which a hammer was attached, which responding to reversals of current struck blows on a small office bell.

Here was a real electro-magnetic sound telegraph, and the Professor was accustomed to operate it before his class, in illustration of the facility of transmitting signals to a distance by the prompt action of electro-magnetism (13). The system was in 1835 repeated on a larger scale at Princeton.

Before concluding his investigations into the physics of the electro-magnet, it occurred to Henry that he could easily combine a long circuit and a fine wire magnet with a short circuit containing a coarse wire magnet in such a way that the oscillations of the armature of the former would open and close the circuit of the latter; and trying the experiment he found it to operate as he supposed; so that the practice of combining main and local circuits soon to be so familiar to us in telegraphy here found its germ.

This brief story of the electro-magnet is the story of one of the most important foundation stones in American Telegraphy, and while no element of a structure howsoever important is the structure itself, the work of Henry in the evolution of the electro-magnet is of such vital consequence that every American telegrapher giving thought to the subject must be prepared to endorse to the fullest extent the conclusion reached by Taylor in his biographical sketch, that "amid the galaxy of brilliant names who prepared the success and organized the triumph for the execution of skillful inventors and artisans, none stands higher, or shines with more resplendent luster than that of Joseph Henry."

The final great discovery which underlies the practical American telegraph of the present time is that of "magneto electric induction" made in 1831, by Henry's equally great and worthy contemporary, Faraday.

But, as if my present design be carried out, I shall require in subsequent papers, to consider the progress which has been

made in the generation of machine currents, and their application to telegraphy, it does not seem necessary to discuss the subject of Faraday's discovery, now or in the present connection, and its history and nature briefly detailed, will form a fitting preface to the history of such progress, when the time for the record is reached.

I conclude the present paper, therefore, with the labors of Henry, and shall hope to begin the next with a record of the propositions and attempts looking to practical telegraphy, brought forward and made prior to 1832, the year of the memorable conception of Morse.

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EARLY REMINISCENCES.

BY CHARLES F. WOOD.

I think I might with every assurance say that no member of the "Telegraphic Historical Society," who will attend the annual meeting, to be held in Washington on the 1st of May, could experience feelings of such great gratification as I should upon this occasion. For Washington was my home. All the early associations of my life cluster around this place. It was here I first met Professor Morse and the early pioneers in the telegraph enterprise, and it was here I commenced my telegraphic career, on the 1st of November, 1848, in the office of the Magnetic Telegraph Company, the first organized telegraph company, which was located in Toner's printing office, at the corner of Sixth Street and Louisiana Avenue. It occupied three small rooms on the first floor. The front room was used for the Receiving Office and Delivery Office, the middle room for the operators, and the adjoining one for the President, who acted as Superintendent. The force consisted of a manager, five operators, and a receiver, who took charge of the Delivery Department. No lineman was regularly employed, but a carpenter by the name of McDuell was sent for whenever the services of a lineman were required. And this brings to mind an incident, showing how repairs were conducted in those days.

After a very severe snow storm during the night, we met in the operating room on the following morning to find all the wires down. McDuell was sent for, but he notified the Manager that he had an important job on hand that must be finished that day. Of course we understood that McDuell wanted to avoid tramping through the snow. At 9 o'clock the President (Mr. B. B. French) appeared, and the report was made to him of the condition of the wires, and that McDuell had been notified but failed to report. Then, said Mr. French: "Gentlemen,

there is but one thing to be done; *we must go.*" Preparations were made, and we all started, leaving the Receiver in charge of the office. The walking was very bad, and the President, who was a corpulent man, began to show signs of fatigue as we passed down Louisiana Avenue, and coming to a halt, and breathless, he said: "Upon further reflection, I think we had better let McDuell attend to this job to-morrow. (Addressing the Manager) Mr. Bailey, will you please give the necessary instructions. And now, gentlemen, if you will accompany me to my house, which is near by, I think Mrs. French will find us something good to eat." To which we heartily assented.

Of the force employed in the Washington office in 1848, during the time I was there, so far as I have been able to learn, there is but one other survivor besides myself, and that is Judge Lambert Tree, of Chicago. There were two ponderous registers in use, which required the services of two operators in bad weather; one to read off the paper and keep the relay adjusted; the other to copy.

Telegraphers of to-day have not the remotest conception of the difficulties the telegraphers of those days had to contend with, in bad wires, imperfect insulation, rude machinery, and the little knowledge they had of the wonderful force they were dealing with, then in its infancy.

Although the lines of the Magnetic Telegraph Company extended from Washington to New York, such was their imperfect condition that all business had to be repeated at Philadelphia. At stated times, while I was employed in the Washington office, efforts were made to reach New York direct, and such occasions were looked forward to with a great deal of interest. Business was suspended for the time, but no success attended any of these efforts. In Mr. Reid's "History of the Telegraph in America," he says: "From Mr. French's report of July 12, 1849, an insight is had into the condition of the lines even at that comparatively late date." Speaking of the working of the two wires put up from Washington to New York, he says: "I do not intend to say that *both* wires have

worked *independently* of each other, or that the line has worked through without repeating, but that it has been in the power of the Company, with but few interruptions, to send messages from Washington to New York." Quoting again from Mr. Reid. "In a report by Mr. French of the imperfect working of this line, after making a laborious journey over it, doing much needed work in removing obstacles, the following curious language occurs: 'After finishing my journey, I sent a message from New York to Washington, which on comparing it afterwards with the original, I found *had been received word for word.*'" "Such a triumph," says Mr. Reid "gives a singular insight into the telegraphic condition of the times."

In the early part of 1849 I was transferred to the New York office, and the main object the President had in sending me there was, that I should keep him advised as to the working of the lines, particularly those running up the North River, which were reported to be in very bad condition. I left the Washington office, with its pleasant associations, never to return to it again. The office in New York was located at the corner of Hanover and Beaver Streets. The force employed consisted of a manager, seven operators, receiver and delivery clerk.

Various attempts had been made to establish telegraphic connection across the North River, but all had failed. Then a line was built, 105 miles in length, via West Point, crossing at Horse Neck on a mast erected on the island there, bearing the wires. But the contractors were entirely ignorant of what constituted a properly constructed telegraph line, and the result was it was practically useless, unless the conditions were very favorable, and the business for a very large part of the time was repeated at Jersey City.

In the summer of 1851 the Magnetic Telegraph Co. established its first branch office at No. 203 Broadway, near the corner of Fulton Street, in a room occupied jointly with a merchant tailor. And I well remember the prophecy of Mr. Swain, the president of the company, when he said: "You will live to see Manhattan Island covered with branch offices."

To me that seemed a very visionary statement at that time. But Mr. Swain was correct in his prophetic vision.

On the 26th of October, 1851, I was appointed manager of the New York office. Mr. Swain had been elected president the year before, and the change of administration was felt at once over the entire line, when he assumed the management. His address to the operators on the 16th of October, 1850, shows the character of the man who was to give a new impetus to the business. He says: "I am desirous to have the Magnetic Telegraph Co. become a model for other lines to follow in its manner of transacting business, its directness, promptness and fidelity to the public. I am desirous of this, as well for the credit of each of us, as for the interest and prosperity of the company itself.

"The only correct principle of competition in business, and which I consider to be the only safe one for any person to rely upon in any business, is to serve customers better than a competitor can serve his. It appears to me that any person is safe in business if he unite a consciousness of ability to do this, with a determination to the same end.

"If the Magnetic Telegraph Co. can acquire the reputation of being the model line of the country, and it can only be acquired with the aid of all its departments, it will secure the greater proportion of business, and those employed upon it will be sought for by other companies at higher rates of compensation, than will be offered to those from lines of less repute.

"Now, to acquire this desirable reputation, the line, in all its management, must be not only in reality pure, but like Cæsar's wife, above suspicion. It must be so in appearance as well as in fact."

Mr. Reid very justly says: "No company organized in America has had its affairs managed with more scrupulous honor, or minute care, or intelligent vigor, than the Magnetic Telegraph Co. under Mr. Swain, and to him must ever be accorded the first rank as telegraph administrator. It is not too much to say that the example of that company, the care

perhaps of its instructions, the safeguards it adopted, the sense of responsibility it inspired, had much to do in shaping the telegraph administration of the country."

And it was with great regret at parting with Mr. Swain and my associates of the Magnetic Telegraph Company, that, with his advice and consent, I accepted the appointment of superintendent of the New York and New England Union Telegraph Company, in September, 1853.

ANNUAL MEETING
OF
THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

HELD AT WASHINGTON, D. C., MAY 6, 1896.

THE TELEGRAPHIC HISTORICAL SOCIETY
OF NORTH AMERICA.

The Society met at 10 A. M., May 6, 1896, in the Washington Loan and Trust Building, and was called to order by the First Vice-President, Mr. S. H. Kauffmann.

On opening the meeting Mr. Kauffmann said :

“The first thing in order, as noted on the memorandum just handed me, is an address by the President. I was not certain that I could attend this meeting, and if I had been, I do not think I could have prepared an address. I wish to say, however, that I take great interest in this organization and am very glad to meet the gentlemen of the fraternity here.”

A letter from President Cornell was then read, as follows :

NEW YORK, April 14, 1896.

GEO. C. MAYNARD,

Secretary.

DEAR SIR: Your valued favor of the 11th inst. has been duly received.

Important interests call me West the first of May and it is hardly likely that I shall be enabled to return in time to be with you at the date named.

You will please take such action as may be necessary and appropriate to a suitable observance of the anniversary of the Society.

Yours very truly,

A. B. CORNELL.

The minutes of the last annual meeting of the Society were read and approved.

The report of the Secretary and Treasurer, which was read and accepted, contained the following statements :

* * * During the past year the business of the Society has made gratifying progress, principally in the collection of historical information. Much of this information is necessarily of a somewhat fragmentary character, and cannot immediately be put into shape for publication. It will, however, be of great value in the future preparation of accurate historical sketches. The interest in this subject, on the part of members of the Society and others, is continually increasing as the importance of the work is better understood; and numerous promises of valuable contributions have been made to the Society.

Inquiries made by the Society have shown that there are in existence many manuscript documents, containing important information relating to telegraphic history, which has never been published and which will correct many popular errors and clear up disputed points which have been the subject of controversy. The fact that this Society holds an entirely independent position in its undertaking to get at historical facts, gives it opportunity to do effective work, in this direction. A lack of sufficient funds has prevented the publication of papers presented to the Society, but it is hoped this difficulty may soon be overcome.

The Society has received some very interesting and valuable additions to its collection of relics, etc., which have been deposited in the Telegraphic Collection of the National Museum, where they are placed on exhibition subject to the order of the Society. * * *

Number of members at date of last annual meeting,	264
Additions since that date,	20
Deaths,	4
Resignations,	2
Present membership,	278

Since May 1, 1895, the Society has lost the following members by death:

Franklin L. Pope, Great Barrington, Mass., died October 13, 1895.

Daniel P. McKeever, Washington, D. C., died January 14, 1896.
 Orin Jenks, Mannington, West Virginia, died March 3, 1896.
 Suel Smith, Boston, Mass., died March 13, 1896.

The amount of funds on hand at the beginning of the year was	\$ 89.88
Amount received during the year.....	251.00
	<hr/>
	\$340.88

EXPENDITURES.

Printing.....	\$31.00
Stationery	10.85
Rubber stamps	2.50
Typewriting	4.00
Postage	10.00
G. C. Maynard, cash advanced, incidentals.....	27.15
	<hr/>
	85.50
Balance on hand at this date.....	\$255.38

Mr. Rhoads. I would like to inquire whether the Society is able to have the Minutes of last year's meeting printed so that each member will get a copy?

The Secretary. The Minutes of last year's meeting and the papers presented at that time have not been published for want of funds, but there were published in the newspapers quite full reports of the proceedings of the meeting, and copies of these papers were sent to all members.

The Chairman. It occurs to me that it would be a good idea for the Secretary to prepare and send out a circular asking for special contributions to a publishing fund.

Mr. Lockwood. If the dues of all members were promptly paid we should probably have sufficient funds for that purpose.

The Secretary. If special subscriptions are solicited, it might be well to make the funds received applicable to a publication and library fund. There are occasional opportunities to pur-

chase some valuable historical books at a low price which the Society would do well to take advantage of.

The Chairman. In making this call for a library and publication fund, it might be well to state this fact in a circular letter addressed to members.

The Chairman, referring to the recent death of several members, asked whether the Society wished to take any action thereon, and after some discussion, in which Mr. Lockwood, Mr. Wilson and others took part, the Society authorized the appointment of a committee to prepare biographical sketches of the deceased members, and Messrs. Lockwood, Hine and Marean were appointed as such committee.

The Chairman, Mr. Kauffmann, having an important appointment, asked to be excused, and called Second Vice-President Wilson to the chair.

Before leaving the meeting, Mr. Kauffmann stated that he would be out of the city for the next five or six months and that before leaving he wished to especially commend to the Society the subject of the publication and library fund, and handed the Treasurer his check for twenty-five dollars to be applied to that fund.

The nomination of officers for the ensuing year being in order, the Chairman appointed Messrs. Marean, Lockwood and Ash as a committee on nominations.

After conference the Committee on Nominations reported as follows :

For President, S. H. Kauffmann, Washington, D. C.
 For 1st Vice-President, Wm. B. Wilson, Philadelphia, Pa.
 For 2nd Vice-President, Thos. D. Lockwood, Boston, Mass.
 For 3rd Vice-President, Robert Pitcairn, Pittsburgh, Pa.
 For Secretary and Treasurer, George C. Maynard, Washington, D. C.

For Members of the Executive Council :
 W. H. Young, Washington,
 Chas. Selden, Baltimore.
 M. B. Leonard, Richmond.
 George M. Dugan, Chicago.

The nominations were laid before the meeting and the persons recommended by the committee were unanimously elected.

Mr. Lockwood being called upon to read a paper which he had prepared, said, "I wish to say to you Mr. Chairman and the officers and members of the Society who are present, that I have prepared this paper at the request of the Secretary. It is a continuation of my last year's paper, written not because I wanted to write it, but because I believed it to be my duty to do what I could to further the objects of the Society. Nearly every member here has said that he has a great deal of work on his hands, and while I do not wish to boast, I believe I have as much on my hands and head as the rest of you. Nevertheless, I intend, as long as I can do it, to come myself to these meetings, and when I cannot come to send something.

The paper, as I said, is a continuation of the initial history of the telegraph, and that is largely before it reached this country. If the Society and its members are spared for another year, and perhaps for another year, we shall get over these dry details and then, it has occurred to me, it will be instructive to take up such subjects as reading by sound and the invention of special instruments which have proved to be useful, such as the climbers, etc. There never was a patent on the climbers and the man who invented them never received anything for his invention, except perhaps, the nomination to take charge of the restaurant at the top of the Western Union Building in New York, which might have been valuable for its patronage. The subject of repeaters—a very interesting subject indeed—if nobody else does it better before I get to it, in due time I propose to take up; but I hope everybody will think better of it and give us so much on those and other subjects that there will be nothing left for any of us, after a few years, except to come here and look at one another and admire our increasing or decreasing gray hairs, as the case may be."

HISTORY OF THE ELECTRIC TELEGRAPH,

PART II.

BY THOMAS D. LOCKWOOD.

My last year's paper, of which this is the threatened continuation, discussed what may be called the imaginative period of telegraphy; and the underlying electrical, magnetical, and electro-magnetical principles and discoveries upon which modern telegraphy is founded.

Doubtless there is a multitude of persons in Germany who still believe that to Steinheil, many in England who believe that to Cooke and Wheatstone, and many in America who still believe that to Morse, the invention of electrical telegraphy in general, is attributable; and that these several great inventors were each, respectively, the first and only true original and absolute discoverers of the art; and some, possibly, who still tenaciously hold to the faith of their earliest years, that before the time of their own bright particular hero, no one had ever even imagined the possibility of transmitting intelligence by electricity; and that no plans for it had ever been made by any one.

This, however, is quite beside the mark; since before the advent of any of the inventors and electricians I have mentioned, there had lived and thought, a host of able and ingenious persons, who foresaw that the great velocity of electricity in motion might, in some way, be made to facilitate the transmission of messages; who realized in some degree the value of the possible electric telegraph; and who themselves groped more or less successfully among the items of scientific knowledge and guess work at their disposal, hoping to put such items together, after such a fashion that messages could be sent without paying too dear or high a price.

Many of the earlier of these aspirants for inventive fame and fortune did not wait for the advent of the voltaic battery, and the steady electric current to be obtained from it, but tried their best with the frictional machine as a generator, and with so unsteady a force as electrical charges, produced thereby, and accumulated in Leyden jars; these agencies only, at the early dates of which we are speaking, being available.

THE PROPOSED TELEGRAPH OF C. M., 1753.

The first serious and unmistakable proposal to construct an electric telegraph dates back as far as February 17, 1753, and is contained in a letter printed in the Scots Magazine, Edinburgh, of that date.

The letter is too long to quote here in *extenso*, and I must content myself with saying, that the writer proposed to employ a set of wires equal in number to the letters of the alphabet; to insulate these from the earth by supporting them at twenty yard intervals in glass or jeweller's cement; to hang a little ball (elderpith probably) at the end of each wire, to which also the letter indicated by such wire is attached; and to send discharges over one wire or another, according to the particular letter which at any moment is to be transmitted.

The inventor says that if the system is used with wires of great length, the "electric fire" might possibly be "entirely drained off by the surrounding air"; and he goes on to make the following remarkable suggestion:—"To prevent the objection, and save longer argument, lay over the wires from one end to the other with a thin coat of jeweller's cement. This may be done for a trifle of additional expense, and as it (the cement) is an electric *per se* (a non-conductor), it will effectually secure any part of the fire from mixing with the atmosphere."

The letter was signed C. M. and to this day its writer is unknown; although Sir David Brewster and others guessed him at one time to be a certain Charles Marshall of Paisley;

and at another time one Charles Morrison of Renfrew, but without any trustworthy evidence in either case.

In the same letter, C. M. remarks that persons thinking his preferred mode of receiving signals tiresome, might employ a range of bells of different sizes and tones in front of the ends of the wires, *and read the messages by the sounds made by sparks in jumping from the wires to the bells.*

Considering that the subject was utterly and absolutely new, I think the letter of C. M. as remarkable a one, as a letter written at the present time, advocating the feasibility of long distance smelling by electricity, and showing how it could be done, would appear a hundred years from now, if the thing should meantime be done at the end of eighty of these hundred years. It shows that the writer appreciated that electricity could traverse wires and convey signals; that the impulse could be prevented from escaping at points of support by insulating the wires with glass, etc.; that if desired the wire could be insulated throughout its length by covering it with some non-conductor (although I doubt whether he could find many now to agree with his view that "this may be done for a trifle of additional expense;") and that he foresaw the possibility of using bells as telegraphic receivers, and foreshadowed reading by sound. It would appear that he contented himself with writing his letter, and never even tried to reduce his proposal to practice; since we hear no more of it.

TELEGRAPH PROJECTED BY BOZOLUS, 1767.

Next comes the plan of Bozulus, a Jesuit living at Rome, who, in the year 1767, or before, proposed an electrical telegraph having two underground wires extending between two stations, and at both to have their ends arranged near together. He would, so he said, transmit over these by discharging a plate or Leyden jar through the two wires at one end, and receive by watching the sparks resulting from such discharge, jump between the ends of the two wires at the other. Bozulus remarks that an alphabet of such sparks can readily be arranged

with a friend, and a means of communication be thus devised. This part of the work he thinks is pretty easy, and he accordingly leaves each one the privilege of arranging it according to his own judgment.

The only original record of this scheme, so far as I know, is to be found in a latin poem, "Electricorum," published in the year 1767. It is, however, also to be found in Fahie's History of Electric Telegraphs prior to 1837.

ODIER'S TELEGRAPH, 1773.

This also amounts merely to a proposal, but it is interesting as bringing in the name of Franklin, who may possibly be the suggestor.

However, we have it from Louis Odier, a physician of Geneva, who writes that while dining at Sir John Pringle's table with Franklin, Priestly and other great geniuses, he devised a plan by which to enter into intercommunication and conversation at a distance of four or five thousand leagues, and in less than half an hour, with the Emperor of Mogul, or of China, or of any other people.

ANONYMOUS PROPOSAL, 1782.

The next instructions showing how to do this, are to be found in an anonymous letter to the Journal de Paris, May 30, 1782.

The projector,—another of the kind willing to show others the way to do something which he does not appear inclined to do himself,—also favors underground wires, and he proposes to have two of them for each letter, each terminating at both ends in a knob laid in two wooden tubes filled with resin. Between the knobs of each pair is a letter cut from tinfoil, and the inventor says "if at the other end we touch the inside of a Leyden jar to one knob, and the outside to the other, the jar will be discharged through the wires, and the letter illuminated." He suggests a code which he calls "tachygraphy" to reduce the number of wires to five pairs; and also an electric bell-call.

The foregoing are not much known, but we now reach more familiar ground in the the telegraph system of Le Sage, a really able and ingenious man ; and of this mention is made by a number of writers on Telegraphy.

LE SAGE, 1782.

Fifth in order, therefore, is the method of George Louis Le Sage, a very learned scientific man residing at Geneva. Writing in 1782, he says it occurred to him "thirty or thirty-five years ago." This method, like that last mentioned, was to consist of twenty-four metallic wires insulated from one another. Each wire was to be connected at the receiving end with a separate pitch ball electroscope of the ordinary kind, and was also understood to represent always the same letter of the alphabet. In this way any letter could be indicated by bringing to the transmitting end of the line an excited glass tube, which would produce instantly the divergence of the electroscope balls of that particular wire at the receiving end.

The electricity travelling on the wire charges both balls alike, and they consequently repel each other and diverge.

One remarkable feature of the Le Sage proposal is that he provides that the line wires are to be laid in a glazed earthenware or glass tube underground ; and are to be kept apart by being drawn through holes in disks of like material—a plan which within the last twenty years has actually been patented in this country.

Moigno writing in 1852, Sabine in 1867 and Taylor in 1879, all say that Le Sage actually established his telegraph at Geneva in 1774 ; but I have not been able to find any authority for the statement, and I do not believe there is any. Moigno evidently fell into an inaccuracy, which the subsequent writers followed ; not an uncommon thing in history.

LOMOND, 1787.

Next and sixth comes the telegraph of Lomond of Paris, which really on a small scale was constructed and tried. A

single brass wire was fitted with a pith-ball electroscope at each end and the signals were sent by charging the wire, thus causing a divergence of the balls of the electroscope, and an alphabet was formed out of the different arrangements of the motion. This was really an important advance, since at a single jump it reduced twenty-four wires to one.

Arthur Young, traveler and naturalist, writes interestingly in his journal of this system. He says: "Lomond * * * has made in electricity a remarkable discovery. You write two or three words on a paper; he takes it with him into a room, and turns a machine inclosed in a cylindrical case, at the top of which is an electro-meter, a small fine pith ball; a wire connects with a similar cylinder and electro-meter in a distant apartment; and his wife, by remarking the corresponding motions of the ball, writes down the words they indicate. As the length of the wire makes no difference in the effect, a correspondence might be carried on at any distance."

This description forcibly reminds one of, and is very like that of the prayer machines which, according to the missionaries and travellers, the benighted inhabitants of Thibet employ to waft their petitions heavenward.

CHAPPÉ, 1790.

We now reach the plans of Chappé, a man who was determined to send telegraphic messages in some way. He first tried clocks running together, one at each of two stations connected by a short wire. Words, phrases or symbols were inscribed round the dials, and when the pointer which was made to go fast, pointed at a symbol which was to be indicated, the transmitter would strike a resounding blow on a gong connected to the end of the wire. The receiving operator hearing the sound would note the symbol pointed at, and the message was thus received, by successive symbols and blows. This was of course purely a sound telegraph, and must have been as agreeable to the neighbors as a base drum or a cornet learner on the other side of a lath and plaster partition.

Our inventor must have found it rather impracticable for he soon discarded it, and bethought himself of the possibilities of electricity which he had studied. He retained his clocks, and erected insulated wires between two stations a little distance apart, and arranged that the discharge of a Leyden jar should be substituted for the stroke on the gong. But at this stage he met the difficulty which previous contrivers also would have met, had they really constructed telegraphs with out-door wires—the difficulty of insulation.

Chappé saw no means of overcoming this, and in fact since the battery had not yet appeared there was none; so he took to inventing optico-mechanical semaphore telegraphs, which proved very successful, went into practical use, and continued in use, until they, in process of time, were displaced for all time, by the power which Chappé for a brief time had tried to domesticate.

ST. CYR, 1790.

In 1790, Reveroni St. Cyr, later one of Napoleon's most capable generals, proposed an electric telegraph for announcing the result of lotteries, but details are lacking.

REUSSER, 1794.

The ninth proposal was a step to the rear since again it required many wires. It was made by Reusser of Geneva, a place which seems to have been a stronghold of chronic inventors.

Both ends of a number of line wires (one for each letter), were to have little squares of tinfoil affixed to them, each square standing for a particular letter. A single return wire was branched to within sparking distance of all the little tinfoil squares, and the passing sparks thus indicated the letters. Reusser was as keen after the main chance as are some of our more modern inventors, who, by obtaining patents on crude devices, aim at tribute from subsequent successful inventors. He concludes his description in these words:—"Will the execution of this plan on a large scale ever take place? It is pos-

sible, though it would cost a good deal, but post horses from St. Petersburg to Lisbon are also very expensive. *At any rate whenever* the idea is realized I will claim a recompense."

Nearly all writers, owing to that habit of which I have before spoken, of copying statements without verifying them, in describing Reusser's plan, tell us that each piece of tinfoil was cut into the form of a letter of the alphabet, but with many breaks in its continuity, so that on the passage of a spark it became luminous as in the Anonymous French Telegraph, or that of Salva which will presently be reached. This, however, is all fancy, and is not to be found in Reusser's own account.

BOCKMANN AND LULLIN, 1794-'5.

The next two plans were those of Bockmann and Lullin, which were but modifications of that of Reusser, although by combining the sparks to form a kind of code but one or two wires at most were required. Bockmann's is a mere suggestion and I cannot find mention of Lullin anywhere, except in Reid's Telegraph in America.

CAVALLO, 1795.

This was devised about the same time as the two former, but was much better developed, and in a small way was reduced to practice. It is also based on the same principle as the plans of Reusser, and the inventor in his book, "Complete Treatise on Electricity," 1795, remarks: "By sending a number of sparks at different intervals of time according to a settled plan, any sort of intelligence might be conveyed instantaneously from the place in which the phial is situated.

"With respect to the greatest distance to which such communication might be extended, I can only say that I never tried the experiment with a wire longer than * * * about 250 feet; but from the results of those experiments, and from the analogy of other facts, I am led to believe that the above mentioned sort of communication might be extended to two or three miles, and probably to a much greater distance." Cav-

allo was an early, if not the earliest, manufacturer of insulated wire ; and the wire he used was copper, about one-fortieth of an inch in thickness, and covered by himself with an insulation of "successive coatings of pitch, linen strips, woolen cloth and oil painting."

SALVÁ, 1795-'8.

The thirteenth inventor was Salvá of Barcelona ; and the unluckiness of the number thirteen evidently does not extend to inventors, since his plans are remarkable for their foresight and completeness. He proposed to telegraph in several ways by producing sparks which should illuminate tinfoil letters on the plan which mistakenly has always been ascribed to Reusser ; and also by passing shocks through the human body ; and furthermore describes the manufacture and use of multiple conductor cables, for aerial, subaqueous and underground use, precisely as we use them now. Salvá was evidently a man of marked ability, and would surely have made his mark had he lived in our own time. His remarks on submarine cables are so good as to warrant quotation, and are as follows : "In no place (than the bed of the sea) can the electric telegraph wires be better deposited. It is not impossible to construct or protect the cables with their twenty-two pairs of wires so as to render them impervious to the water. At the bottom of the sea their bed would be ready made for them, and it would be an extraordinary casualty indeed that should disturb them."

According to Humboldt, Salvá constructed and operated in 1798 a modification of this telegraph, requiring but a single wire, and extending between Madrid and Aranjuez about twenty-six miles.

All this it must be remembered was before the introduction of the battery. After that we shall hear from Salvá again.

Betancourt, who is mentioned by Humboldt as having devised and built this line, is incorrectly credited therefore with being one of the early telegraph planners by Sturgeon, Moigno, Jones, Highton, Sabine and Reid.

This is evidently a misapprehension, as Betancourt, a Spanish engineer, did, as we find from the Edinburgh Encyclopedia, devise and exhibit in 1798 to the National Institute a mechanical semaphore. There is, however, some reason to believe that the same man was employed by Salvá to erect his line, which of course would account for the mistake.

But arriving at the year 1798, we are close upon the era of Voltaic Electricity, and the battery, and although subsequent to this time some twelve or thirteen other methods of operating with frictionally developed electricity were proposed, I shall refer to two of them only ; the others being chiefly variations of what we have already noticed, and to complete the list of such frictional electricity telegraphs, I will consider the two I except before passing on, although they are thus brought slightly out of their appropriate chronological order.

These two were the plans proposed by Francis Ronalds in England and Harrison Gray Dyar in America.

RONALDS, 1816-1823.

Ronalds took up the subject of telegraphy in 1816 and his researches culminated in the following system :

At each end of the telegraph wire was a clock carrying instead of its hands a light paper disk on which were marked the letters of the alphabet and certain words and numbers.

By means of a perforated cover only one letter and figure were visible at a time, and as the clock continued to move, of course, every letter in turn was presented at the opening. The clocks at both ends were to run together, so that both would show the same letter at the same time. The line was kept charged with electricity so that the pith balls of an electroscope were kept in a state of chronic divergence, and when the letter to be noted appeared at the opening the line was discharged allowing the balls to fall together. The attention of the receiving operator was at the outset attracted by firing an air gun by an electric spark. When this signal was received both stations started their clocks, and before beginning the messages the

operators assured themselves by pre-arranged signs that the two clocks were in correspondence.

This telegraph was by far the most ingenious and simple that had yet been proposed, and is besides noteworthy as being a foreshadowing of the synchronous printing systems of Hughes and others; and of many selective or individual signaling systems which have within the last twenty years been so frequently devised for telephone calls.

Ronalds was very enthusiastic in his work, and before he ceased to experiment he sent messages through eight miles of wire insulated and suspended in the air.

He displayed, however, a distinct preference for underground conductors, and foretold the phenomenon of electrostatic inductive retardation of signals which, many years after, was found to be an inseparable concomitant of underground or submarine telegraphic conductors.

He laid his wires in glass tubes, which were laid together in a wooden trough placed in a trench. The trough was then covered with strips of wood smeared with hot pitch and the trench filled in with earth.

In 1823 Ronalds wrote a book entitled "Descriptions of an Electrical Telegraph, and of some other Electrical Apparatus," which is now scarce, although I believe Mr. George C. Maynard has a copy, and it is interesting to read through this book and note how many of our modern appliances were fully considered by the writer.

On the question of protecting the wires from malicious disturbance, he says :

"To protect the wire from mischievously disposed persons, let the tubes be buried six feet below the surface of the middle of high roads, and let each tube take a different route to arrive at the same place. Could any number of rogues, then, open trenches six feet deep, in two or more public high roads or streets, and get through two or more strong cast iron troughs, in a less space of time than forty minutes? If they could, render their difficulties greater by cutting the trench deeper ;

and should they still succeed in breaking the communication by these means, hang them if you can catch them, damn them if you can not, and mend it immediately in both cases."

Finding his system to work well, Mr. Ronalds brought it to the notice of the British Government with a view to bringing it into practical use; but the long Napoleonic wars were recently closed and the country was tired and poor, and Mr. Ronalds received the following courteous rebuff from Mr. Barrow, the Admiralty Secretary, who at that time was the Barnacle in this particular department of the Circumlocution Office:

"Mr. Barrow presents his compliments to Mr. Ronalds, and acquaints him with reference to his note of the third inst. that telegraphs of any kind are now wholly unnecessary, and that no other than the one now in use will be adopted."

The one "now in use" was a kind of semaphore signal resembling generally those now used on railroads.

Mr. Ronalds then regretfully dropped the subject; but many years later his services were recognized by Knighthood, and dying August 8, 1873, he bequeathed his noble library of electrical works to the British Society of Telegraph Engineers.

DYAR, 1827-1828.

The last telegraph of this class which I shall notice is that of Harrison Gray Dyar of New York, who set up a single wire telegraph on Long Island in 1827. He used frictional electricity which operated by causing a spark to pass through litmus paper on its way to ground. The passage of the spark left a red mark on the paper.

The difference of time between the sparks was by an arbitrary alphabet, as in the plans of Bockmann, Cavallo and Lullin, made to signify different letters. This was the first recording telegraph proposed, and though actually employed, was abandoned in a short time.

A singular circumstance which now seems incredible occurred in connection with this system when Dyar proposed to construct a telegraph line between New York and Philadelphia,

after his Long Island experiment. A writ was obtained against him and his partner, alleging conspiracy to carry on secret communication from city to city; and this so thoroughly frightened them both that Mr. Dyar fled from New York, and in 1828 left the United States and made his home abroad. He subsequently returned, however, and died at Rhinebeck, January 31st, 1875. His story which previously had been but imperfectly known was fully told during the litigation under the Morse Patent.

Though the privilege of fully answering in the affirmative the question propounded by the Almighty to Job, "canst thou send lightnings that they may go and say unto thee, here we are?" was not awarded to the inventors of this long list; we cannot too highly appreciate their energy in struggling with the imperfect means, and small experience at their command, for the realization of an end, which as we now know was for them, well nigh impossible of attainment, for two reasons; first, because they are all in advance of the requirements of the age; and second, because of the peculiar character of the kind of electricity on which they depended. For electrical charges and discharges developed by friction and similar modes is so easily dissipated; so rapid and incontinuous in action; has so little volume, and is so difficult to insulate, that though a form of electrical manifestation, and at that time the best known form, it is at the same time a practically uncontrollable form of electrical manifestation, and would be utterly unreliable.

All electric telegraphs, irrespective of form, depend upon our power to produce the following effects:

First. To develop or evolve electricity in any desired quantity, and of the desired quality;

Second. To transmit it with celerity to any required distance; and

Third. To enable it on its arrival at any assigned point to produce some sensible effects which may serve the purpose of written, printed, visible or audible signals.

Now the second of these as we have seen was attained as early as the middle of the eighteenth century by Gray's discoveries of conduction and insulation.

So too, the third was substantially provided for, by the many proposals in telegraphy which have been detailed, but until the advent of the Voltaic battery, means for the efficient production of the first result were lacking.

The discovery of dynamic or current electricity, and Volta's invention of the battery (as mentioned in the first part of this paper), at the opening of the nineteenth century, met this sorely felt want, and revolutionized electrical science; putting into the hands of the philosopher and experimenter a new and most powerful instrument of research.

But the third element of success having now been provided, how is it to be utilized? Are any of the appliances whereby the presence of high tension electricity such as that generated by friction is made known, adapted to produce signals under the influence of the Voltaic current? Unfortunately not.

Thus, though mankind was now possessed of a knowledge of conductors and insulators; of the velocity with which electricity travels; and has also acquired the power to generate currents in constant and continuous flow, it really seemed for a further term of years as if no real progress in the art of adapting electricity to telegraphy had been made. Nay, the invention of the battery absolutely appeared to be a step backward; for only when the cells were multiplied almost infinitely, could their current affect an electroscope, whereas frictional electricity easily had that power.

But one attribute of the battery cell presented a hopeful outlook; that attribute was the power of producing the chemical decomposition of certain substances.

This power was discovered by Nicholson and Carlisle of England, the same year that the first Voltaic battery was constructed, 1800; and became the basis of several of the early telegraphs, and subsequently also of the electro-chemical systems of later days, such as those of Bain, Morse, Smith, Davy, Bakewell, Caselli, Sawyer, Edison and Little.

I have with diligent search been able to find a record of five inventors, who in the early days before electro-magnetism, came to the front, and proposed to employ the decomposing power of the battery current as a message bearer.

These with Salvá (the same as he whom we have already noted as a most ingenious inventor in frictional electricity telegraphy) in the years from 1800 to 1804; Soemmering of Bavaria in the years from 1809 to 1812; Schweigger (who afterwards invented the galvanometer) in 1811; Sharpe in 1813; and Coxe in 1816.

Of Salvá's voltaic current telegraph, it is sufficient to say that as his first battery he actually employed a number of frogs in series, but later employed Volta's pile; that he proposed to use six wires and a common return, making with them various combinations; and that the decomposition of water, and the consequent formation of the two gases in small flasks, served to indicate the signals.

Soemmering's telegraph operated on the same principle as Salvá's and is better known. It required seventy wires in all; thirty-five to send and an equal number to receive, since he had a wire for each letter and for the numerals one to nine. Each wire terminated in a glass reservoir of acidulated water, and, when the battery was applied to any wire at the transmitting station, a bubble of gas was evolved from that wire, and thus denoted the letter represented by that wire. This system received much attention from many of the princes, statesmen and philosophers of the day, but was much too complex and impractical to be commercially successful. Schweigger's system was a modification of that of Soemmering. He was a scientific journalist of Nürnberg, a man of much originality and reduced the number of wires to two, indicating the letters not by bubbles, but by the time elapsing between them.

We do not know much about Sharpe's system, except that he himself was Mr. J. R. Sharpe of Alfreton, England, and that when he heard of Soemmering's telegraph, he wrote to the *Repertory of Arts* June 16, 1816, saying, in 1813, he

had experimented "showing the advantages to be obtained from the application of the electric principle through an extensive voltaic circuit to the purposes of the ordinary telegraph; and had exhibited his plan to the Lords of the Admiralty."

They do not appear to have been convinced by Sharpe's arguments, and dismissed him with substantially the same unanswerable albeit somewhat short-sighted remark, which they later made to Ronalds, viz:—that "as the war was over, and money scarce, they could not carry it into effect."

Dr. J. Redman Coxe of Philadelphia, being an American, requires our best consideration. He published the following suggestion in Thompson's *Annals of Philosophy*: "I do not know (he says) how far experiment has determined galvanic action to be communicable by means of wires, but there is no reason to suppose it confined as to limits, certainly not as to time. Now by means of apparatus fixed at certain distances as telegraphic stations, by tubes for the decomposition of water, and of metallic salts, regularly arranged, such a key might be adopted as would be requisite to communicate words, sentences, figures from one station to another, and so on to the end of the line. * * * As it takes up little room and may be fixed in private, it might in many cases of besieged towns, &c., convey useful intelligence with scarcely a chance of detection by the enemy. However fanciful in speculation, I have no doubt that sooner or later, it will be rendered useful in practice."

There is nothing to suggest that Dr. Coxe ever reduced his ideas to practice, but we must give him credit for the great faith which he expressed in the future of electrical telegraphy by Voltaic currents, a faith which we have seen to be fully justified.

There is no room for doubt that if no further broad scientific advances had been made, the early and apparently chimerical projects we have been considering, would gradually but surely have developed into practical electro-chemical telegraphs, such as those which grew up and were operated even after the Morse telegraph had been introduced.

But science did not cease its onward march, and the great discovery by Örsted in 1819, of the principles of electro-magnetism, followed up by the galvanometer invention made by Schweigger in the following year; the electro-magnet by Sturgeon in 1824; and its perfecting later by Henry, turned invention into another channel, and opportunely determined that the practical telegraph of the future should have in some form an electro-magnetic foundation.

And this was a fortunate circumstance, because before the telegraph embodying these newer principles was fully ready for the public the constant battery of Daniell was produced; and before it had gone far into use, the acid batteries of Grove and Bunsen were also at its disposal.

The three great rival systems of practical telegraphy which were ultimately devised, those of Morse, Cooke and Wheatstone, and Steinheil were all electro-magnetic telegraphs, worked out in different ways; and although between the time of Coxe, and the appearance of these, other projects arose, since they were also electro-magnetic, they belong with the said three great systems, and will therefore be dealt with in the next instalment of this history, which it is expected will reach and include the work of Morse; after which, telegraphic history as far as we are concerned, will be mainly the telegraphic history of North America.

In preparing this history so far, the following works have been consulted:

- Electric Telegraph, its History and Progress. Highton, London, 1852.
- American Electro-Magnetic Telegraph. Vail, Philadelphia, 1845.
- Traite de Telegraphie Electrique. Moigno, Paris, 1852.
- Historical Sketch of Electric Telegraph. Jones, New York, 1852.
- History, Theory and Practice of the Electric Telegraph. Prescott, Boston, 1866.
- The Electric Telegraph. Sabine, London, 1867.
- The Telegraph in America. Reid, New York, 1879.
- Henry's Contribution to the Electro-Magnetic Telegraph. Taylor, Washington, 1879.
- History of Electric Telegraphy to the year 1837. Fahie, London, 1884.

Mr. Marean. I move that the thanks of this Society be extended to Mr. Lockwood for the valuable and interesting paper in regard to early telegraph history, which he has just read.

Mr. Hine. I have great pleasure in seconding that motion. I think the collation of facts in chronological order, as Mr. Lockwood has given them in his paper, is simply invaluable.

Mr. Austin. I would like to supplement that with a motion that the paper be incorporated in the proceedings of the society.

The Chairman. The paper is regularly presented to the Society for that purpose and will be printed as soon as practicable.

Mr. Marean's motion was unanimously adopted.

Mr. Hine. I would like to ask Mr. Lockwood how far back he went in the paper that precedes this one.

Mr. Lockwood. I went back as far as the Dark Ages, about 1100 A. D.

Mr. Hine. I was reminded of a paper that I read at the meeting of the Old Timer's Association called the "Telegraph of the Ancients."

Mr. Lockwood. That paper dealt largely with the same subject as my paper of last year, "The Sympathetic Telegraph." In those early times there was a fiction, that if two persons each carried a magnet which had been rubbed on the same lodestone, they could telegraph to each other by means of the magnets, however far apart they might be.

The Chairman. What action was taken on the suggestion of Mr. Kauffmann in regard to soliciting special contributions to a publication and library fund?

The Secretary. No action was taken. His suggestion was that the Society issue a circular, inviting its members to make subscriptions to such a fund.

The Chairman. It would be in order for this meeting to

adopt a motion authorizing the Secretary to issue a circular, asking members for special contributions for the publication of historical matter and the purchase of a library.

Mr. Lockwood. I hope this subject will be discussed quite fully. I realize the difficulty the Secretary must have in putting anything before our members in such a way that they will read it and act upon it before it becomes an old story, or is cast into the waste basket. I think this is shown by the comparatively small amount of dues which have been received so far. It cannot be doubted that with a large majority of our members, the amount of the yearly dues is not a consideration at all. While the members of this Society evince the greatest interest in its purposes, they are simply so crowded with important business that they sometimes neglect to promptly pay these small bills. There should not only be some such circular prepared, but the Electrical Journals should be asked to aid the Society by publishing a statement of its plans.

The Secretary. Mr. Lockwood is quite right in his understanding of the situation. I think that the failure on the part of some members of the Society to pay these little bills of two dollars, as soon as they are received, is no indication of a lack of interest in the Society. In fact, some of the members who are now in arrears have been most active and useful in collecting and sending in historical information. It is quite likely that the larger the amount of their bills become, the more apt they will be to pay them. One of the best ways to secure the attention of members and elicit their active interest, will be to let them know what the Society is doing, by furnishing them with printed copies of the proceedings and of such valuable papers as Mr. Lockwood has contributed. I have no doubt that other members will follow Mr. Kauffmann's very practical example, and that the Society will soon have funds for this purpose.

The Chairman. It has been moved and seconded that the Secretary be authorized to issue a circular soliciting subscrip-

tions to a special fund for the publication of the papers of the Society, and for the purchase of books for the library.

The motion was unanimously adopted.

The Chairman. I wish to refer to a matter that has recently come under my observation, which is one of the results of the organization of this Society.

Henry J. Rogers was the assistant superintendent of the government line erected between Washington and Baltimore, under the authority of the Secretary of the Treasury. He was associated with Professor Morse in the early experiments and died some years ago. He left a history of the telegraph in manuscript which he had prepared, and many letters written by Professor Morse, giving him detailed instructions in regard to the maintenance and operation of the line. On one occasion, Professor Morse wrote Rogers to be careful in the proper spacing of his letters and confining him to a speed of eight words a minute in transmitting messages. He said he did not want telegraphing to be done faster than that.

Rogers has two descendants living—a grandson and a granddaughter. I called upon the latter recently and had some conversation about the papers. I found that she also had the government seal, bearing the words "United States Telegraph," which was used to stamp all messages. The young lady is now preparing for publication a description of the articles in her possession and she hopes to find a publisher for the work. I think, eventually, we may have the custody of these Rogers papers. This simply illustrates the good this Society is doing. The young lady saw in the newspapers a paragraph relating to our meeting and placed herself in communication with me in regard to this matter.

The Secretary. The Chairman's statement about the Rogers' papers is of much interest. It has been said over and over again, that at the time of Henry J. Rogers' death, all his historical papers had been deposited in a certain public library.

It is made very evident from what Mr. Wilson has discovered, that the more important papers of Rogers are not there. This is a fair sample of statements that are continually being made and of the valuable information we are discovering.

Mr. Rhoads. I have been inquiring what salary is paid the Secretary and Treasurer of this Society, and have learned that the work which he has done has been entirely voluntary, and I, therefore, move a vote of thanks to him.

The motion was seconded and adopted.



In Memoriam.

FRANKLIN LEONARD POPE,

a distinguished telegrapher, and a member from whom this Society had reason to expect, for many years to come, valuable aid and active co-operation, was accidentally killed at his own residence in Great Barrington, Mass., by the alternating current of a system of electric lighting, October 13, 1895.

His lamented death produced a deep gloom in all electrical circles. That a soldier should fall in the battle field, or that a sailor should meet with a glorious death on the deck of a man-of-war, or lose his life in the storms that have wrecked so many gallant vessels, seems a natural as well as honorable termination to the career of each. But that such a man as Mr. Pope should be slain by the force he so well understood, in consequence of the slovenly work of electro-mechanics, impresses us with the same feelings of dismay and unalloyed grief which we should experience in hearing that some well known and universally respected and admired army officer, who had passed unscathed through many a hard fought battle, had been slain by the accidental discharge of a gun in the hunting field.

Franklin Leonard Pope was born in Great Barrington, Mass., December 2, 1840.

His school education did not exceed that of many other telegraphers, and consisting of the regular village school course, followed by a term at Amherst, came to an end before he attained the age of seventeen.

But as not infrequently happens, his natural tastes, supplemented by industry, perseverance and observation, were of more value than many schools.

In the year 1857 he entered the service of the American Telegraph Company as operator at his native town, having

already acquired, as he himself said, "a pretty full knowledge of the theoretical principles of electricity and its action." From this position he was very shortly promoted to Springfield, Mass., where he took charge as circuit manager of the line between that city and Albany.

All Berkshire boys who possess ability have a tendency at some point in their career to gravitate towards New York; and in accordance with this natural law, we find Mr. Pope about the end of 1859, occupying a position as draftsman in the Patent Bureau of the *Scientific American*, where he acquired a knowledge of the preparation and prosecution of patents, and where also the liking for technical literary work which to the end was one of his marked characteristics was fostered.

But in 1861 he returned to the practice of telegraphy at Providence, and in 1862 was appointed principal assistant to Marshall Lefferts, engineer in chief of the American Telegraph Company at New York.

While occupying this position his duties were of such a character as to give him a practical experience with the operation of electrical apparatus under various conditions, covering a very wide field. The American Company was a recently formed consolidation of a great number of detached organizations varying widely in their methods of operation and in the character of the apparatus, batteries and other instrumentalities employed by them. The duty of examining and testing all these different systems and determining upon a standard to be used by the consolidated organization was assigned to Mr. Pope, and in pursuance of this object he was necessitated to make a great number of experiments and tests under different conditions, and thus acquired a stock of practical information in relation to the application of electricity to telegraphic and signaling apparatus, which was probably as great as, or greater, than that possessed by any other person in the country at that time. This work consumed two years of such incessant labor as to make serious inroads on the health of Mr. Pope; but it at the same time was of great value to him, as being largely forma-

tive of his subsequent career and success. Here it was that he became convinced of the advantages of applying electrical measurements and scientific methods to the construction, maintenance and operation of circuits, and of the absolute necessity of first class construction and workmanship, on which he from that time invariably insisted.

In consequence of his impaired health, Mr. Pope at this time accepted a position as assistant engineer of the Russo-American Telegraph enterprise, which undertook in 1865 and 1866 to connect the United States and Europe by an overland telegraph, by way of Alaska, Behring Strait and Siberia. In this employment he did yeoman service in the preparation of maps and charts and in the exploration and survey of virgin territory in British Columbia and Alaska, but on the successful laying of the Atlantic cable the overland work was given up, and Mr. Pope after an absence of two years returned east.

Mr. S. S. Laws, who had devised an indicating instrument to visually report to stock brokers the price of gold, engaged our friend in 1867, immediately after his return, to organize a system of electrical lines and apparatus for working the invention practically, and such a system involving not only the gold indicator, but also the instruments for printing quotations of gold and stocks, operated simultaneously by a single transmitter upon lines radiating in many directions, was constructed and put into successful operation by the beginning of 1868.

This system constituted the nucleus of the "Ticker" business of the Gold and Stock Telegraph Company; and to it a year or two later was added a second system of private printing telegraph lines, also organized by Mr. Pope, and operated by a special instrument jointly invented by himself and Mr. Edison.

Between 1871 and 1875, Mr. Pope was engaged almost constantly in improving and developing inventions which he had made in methods of operating railway signals, wherein the entire track was caused to form a portion of the electric circuit; and about the last named year, transferred the inventions and

the business built upon them to the Union Switch and Signal Company, of Pittsburg.

He undertook a new line of work in 1875, when entering the telegraphic service for the last time, he became the special advisory expert of the Western Union and Gold and Stock Telegraph Companies, being charged with the examinations into the novelty and utility of all inventions having to do with the transmission of intelligence or signals by electricity. In this employment Mr. Pope continued until 1880, when he resigned for the purpose of entering upon a private practice as patent solicitor, expert in patent cases, and consulting electrical engineer and electrician.

The remaining fifteen years of his life with brief intermissions was spent in such private professional practice, interspersed to some extent with professional journalism; and among his principal employers and clients were the Baltimore & Ohio Telegraph Company, the American Bell Telephone Company, the Western Electric Company, and the Westinghouse Electric Company.

In literary work Mr. Pope was easily first among North American writers on electrical and associated subjects, and united the various talents of graphic expression, pleasing diction, and accuracy of statement, with the natural and cultivated powers of observation and insight to which reference has before been made.

He has written a host of papers, mainly of a practical character relating to electricity and magnetism and their industrial applications, which have been published in the scientific journals of Europe and America; but his best work is unquestionably his "Modern Practice of the American Telegraph," which passed through many editions and has had a larger sale, probably, than any work ever published in the English language on such a subject, and has, as recently as 1891, been republished and almost completely re-written and revised to date, so that although modestly styling itself the "fourteenth edition" of the old book, it is really a new one.

Mr. Pope was always an enthusiastic journalist. Passing by his earlier transient work, it may be said that the old "Telegrapher" was never better, than when editorially conducted by him after the resignation of L. H. Smith for the few months between August, 1867, and February, 1868.

In 1884, he assumed editorial charge of a New York Monthly "The Electrician," and changing its name to the "Electrician and Electrical Engineer" conducted it, writing many original articles, and contributing much personal work until 1890.

Of late, much of Mr. Pope's literary work has been in connection with the Engineering Magazine, a periodical notable for the high standard of its electrical articles and items.

He was an important and valued member and officer of the American Electrical Society in Chicago, and in 1879 contributed to the Journal of that Society an excellent biographical sketch of the "Life and Work of Joseph Henry."

Mr. Pope was a charter member and the second President of the American Institute of Electrical Engineers, and uniformly was interested to the highest degree in the welfare of that Society.

He was married in 1873 to Miss Amelia Dickenson of Amherst, Massachusetts, who with three children, a son and two daughters, survives him.

Great and high as were his scientific attainments, he possessed others of a still more enduring and lofty character.

Some of us were personal friends of Franklin L. Pope. We, who have that claim, can feelingly testify to his gentleness and purity of character; to his absolute integrity and to the constant and unswerving faithfulness of his friendship once given.

In all his successes he never forgot that he was a telegrapher and that he was once a *young* telegrapher; and not soon will he be forgotten by the decreasing race of those who with him are entitled to class themselves as the "Old Telegraphers."

RESOLUTIONS RELATING TO THE DEATH OF
FRANKLIN L. POPE.

Whereas, in the death of Franklin Leonard Pope this association has lost a member of shining ability and unusual prominence; a man as well versed in the secrets of electrical science as he was widely known in the telegraph world; therefore,

Resolved, That we depart from our usual custom in regard to resolutions, and honor ourselves while we do reverence to the memory of our departed brother by this formal recognition of his worth as a man, his extended usefulness as an electrician, and his eminence as a specialist and journalist.

Resolved, That while we deplore his untimely decease, we rejoice in all that he has left us in the record of a pure and manly life and in the results of his extended researches into the mysteries of that subtle agent which has come so rapidly into prominence as one of the most active factors of modern life and progress.

SUEL SMITH.

Suel Smith, one of our members, was born in Boothbay, Maine, January, 1829. He received a district school education, and spent one term at Kent Hill Seminary, at Readfield, Maine, afterwards teaching school at Readfield and Boothbay.

In 1850 he associated himself with the O'Reilly telegraph interests, which then operated printing telegraph instruments. This was but six years after the advent of the first telegraph line of the country, that constructed by Morse between Baltimore and Washington, so that the connection of Mr. Smith with telegraphy is almost as old as the art itself.

Mr. Smith went to New York shortly after this, but soon returned to Maine, taking a prominent position with the Maine Telegraph Company.

We find him during the following years successively in the American Telegraph Company's New York, Portland and Bangor offices; and he held the position of manager of the Bangor office for ten years, a large portion of which time was occupied in travelling between different towns of the State, teaching storekeepers the telegraphic alphabet. Subsequently Mr. Smith went again to New York, where he became night manager for the American Telegraph Company, and in 1866 moved to Philadelphia, where his wife and two of his children died.

These misfortunes appear to have disheartened him very much for a time, and seem to have made him look longingly towards Maine once more, for he presently returned to Portland, where he obtained employment from the Western Union Telegraph Company, which recently had absorbed the American Company's lines.

In 1871 his energy and ability attracted the attention of the Gold and Stock Telegraph Company, and he became their Boston agent and manager, retaining these positions until the day of his death.

Suel Smith died suddenly at Boston, on Friday evening, March 13, 1896, in Elks Hall, at a meeting of the Royal Arcanum, of which he was chaplain. He was 67 years old, and leaves an invalid daughter to mourn his loss.

He was a Master Mason, a Knight Templar, and a member of the Royal Arcanum and the Ancient Order of United Workmen.

Few telegraphers were more widely known or highly respected than Mr. Smith, and his death occasioned sincere regret among his hosts of friends, who will sadly miss his sterling qualities of heart and mind, and the sweet-natured geniality and gentle humor which evoked the love and appreciation of all who knew him.

PHILADELPHIA, March 1, 1880.

WILLIAM B. WILSON, Esq.

MY DEAR SIR: Your favor of the 25th is at hand. In reply, I scarcely know what to say and what not to say, but I will endeavor to give you some information in a condensed form.

In October, 1845, I met Henry O'Reilly in Rochester, who informed me that he was engaged in the telegraph business and wished me to engage in his service. Henry O'Reilly married a cousin of mine, Miss Macia Brooks. In November following I received a letter at Cheshire, Conn., from Mr. O'Reilly, requesting me to meet him at Philadelphia. I arrived in this city on November 25, 1845. The next day I saw them raise the first telegraph pole in this city at the corner of Broad Street and Penn Avenue, in front of a small hotel called the Nelson House. On the following day I went with Mr. O'Reilly to Lancaster and found a telegraph line already erected between that city and Harrisburg.

It was not in operation for the instruments had not yet arrived. The line consisted of small unbarked chestnut poles, eighteen to the mile, through the top of which was inserted a turned black walnut cross-arm two inches in diameter. Upon one end of this cross-arm was wound a strip of gum cloth. Upon this gum cloth a number fourteen wire was fastened by giving it two turns; this was the conductor. The instruments arrived about the first of January and were placed in the circuit by James D. Reid. The main battery was placed at Harrisburg. The relay weighed at least two hundred and fifty pounds and was enclosed in a large walnut box. Two men were required to lift it upon the table. It was very difficult to adjust and when in adjustment would not remain in that condition for five minutes. More than a week was spent before any intelligible signals were received from either direction.

James D. Reid and H. Courtney Hughes were at Harrisburg; Henry C. Hepburn and myself were at Lancaster. For more than a week we worked faithfully to get the line into operation. On the 8th day of January, 1846, while practicing writing the

alphabet by pressing the finger against the armature of the relay, I discovered that the armature had a motion corresponding to the key of the main line and I mentioned to Hepburn, who was then practicing on the armature, that if he would wait a moment, I would so adjust the armature that he could write upon the register by the key itself. I had no sooner done so, than the armature began to work apparently by itself. We started the paper to see what impressions it made. Comparing the marks with the alphabet, we made out the following words. "Why don't you write, you rascals?" This is the first intelligible message ever sent upon a telegraph line in Pennsylvania, and the first telegraph line put in operation after the experimental line of Prof. Morse, between Baltimore and Washington. Neither Hepburn nor myself could write or read the alphabet without a copy. This was printed in a small pamphlet by Alfred Vail. Mr. Reid had had, however, some experience in the Baltimore and Washington office of the original experimental line. There was great rejoicing at Harrisburg when they found they had been able to get intelligence of any kind to Lancaster. This first line in Pennsylvania worked only in clear cold weather and then very irregularly. In Mr. Vail's pamphlet he gave a few signals or abbreviations. "34" was to make dots to enable one to adjust the relay. Hepburn often sent them "34." Both offices were crowded with people curious to see its operation. Questions were sent and answers received to gratify their curiosity. When Reid sent word to Hepburn to tell the ladies in Harrisburg what kind of weather there was in Lancaster—Hepburn would send him 34. Hepburn would set Reid to making dots. While Reid was making dots, Hepburn could the better read his novel and enjoy his cigar. This was when the novelty of the thing began to wear off, so far as Hepburn was concerned. Very few paid messages were received. The wire broke as often as twice a day. In February Reid and Hepburn left and joined Mr. O'Reilly to aid in the construction of the line between Baltimore and Philadelphia. James M. Lindsey came

from Baltimore and took Reid's place at Harrisburg. Lindsey at Harrisburg and myself at Lancaster operated the line for a few weeks. The only paying business that we did was to send the names of the curious over the line and get them sent back, at ten cents each. We gave the customers the strip of paper and marked the letters of their name under the embossed impression. The novelty finally wore off and for days, Lindsey sat in the Harrisburg office and I in the office at Lancaster without receiving one cent from the public. As before remarked, the line was continually breaking and generally in the morning we would find the line broken. It was finally arranged to keep the battery connected at Harrisburg and at half-past four in the morning, I went to the office to see if I could get a current from the Harrisburg station. If no current, I took the "night line" as it was called, with a bundle of copper wire to hunt the breaks. The mornings that I found the line intact were the exceptions. "The night line" left Eighth and Market Streets, in this city at one o'clock in the morning and arrived at Lancaster at five o'clock, and at Harrisburg about half past nine to ten o'clock. Many times I took this train to repair breaks. With no revenues coming in, Mr. O'Reilly ordered Lindsey to Philadelphia and directed me to take down the copper wire and sell it for old copper, which I did and applied the proceeds towards my board and washing bill, which were in arrears from the date of my arrival at Lancaster.

The office in Lancaster was in the American Hotel, kept by David Lechlar. The office in Harrisburg was in the old depot, on the same site of the present one. Joseph Yeager was the president of the Harrisburg, Lancaster and Mount Joy R.R. A Mr. Beatty was superintendent of the road. When the office was opened at Lancaster, few can imagine the curiosity and credulity of the people concerning the telegraph. David Lechlar, the proprietor of the hotel at Lancaster, was exceedingly fond of unfolding its mysteries to the Lancaster County public. He would get crowds of the country people together

on market mornings and exhibit to them copies of the *Philadelphia Ledger* with holes punched through them, which he said he received by telegraph in less than forty seconds after they were issued from the press. All this was done in the German language. The joke was perhaps the better appreciated when we consider that there was no telegraph at that time between Lancaster and Philadelphia. After the copper wire between Lancaster and Harrisburg had been taken down and sold, I remained in Lancaster until the following August awaiting orders. I may here remark that Mr. O'Reilly by his contract with the patentees was to have the line finished between Harrisburg and Lancaster by January 1st, 1846, to connect there with a line of the Magnetic Telegraph Company, between Baltimore and New York. The original route of this line as contemplated was from Baltimore through York, Columbia, and Lancaster to Philadelphia, and when O'Reilly had completed the line between Harrisburg and Lancaster nothing had been done towards erecting the Magnetic Company's lines. O'Reilly arranged with the Morse patentees to build the line between Baltimore and Philadelphia, and they adopted another route, crossing the Susquehanna at Port Deposit, and allowed O'Reilly to connect with the Magnetic Company at Philadelphia. In July of 1846, the line between New York and Baltimore was completed. In September we built the line between Lancaster and Philadelphia, using a three-ply iron wire. On the first Monday in October this iron wire was extended to Harrisburg. I opened the office at Lancaster for the second time, but then in connection with Philadelphia, and also at Harrisburg in time for the October election. The telegraph then began to pay. The election was very close. James M. Power, the Whig candidate for canal commissioner, was elected by a small majority. While the line was being reconstructed between Harrisburg and Lancaster, Anson Stager joined me at Lancaster, and when I went to Harrisburg I left Stager in charge of the Lancaster office. About the first of November I took charge of a gang of men in the construction of the line

between Harrisburg and Pittsburg, via Chambersburg. People then began to believe in the telegraph. The work between Harrisburg and Pittsburg was done under the direction of Bernard O'Conner, of Lancaster, and myself. The line was finished to Pittsburg on Christmas Day, 1846. The first message sent over the wire was from Gen. Bowman, of Bedford, to President Polk. Gen. Bowman was then in Pittsburg organizing the Pennsylvania volunteers for the war with Mexico. The offices at Carlisle, Chambersburg and Bedford were opened after the Pittsburg. I have thus given you an imperfect history of the telegraph in Pennsylvania, up to January 1, 1847, and I cannot close this letter without a kind remembrance of the part taken in it by your father, who was the secretary of the board of canal commissioners. We were obliged to ask of them many favors which by his intercession were granted. People at that time regarded the telegraph simply as an instrument of speculators, to be used to take advantage of the public in the rise and fall of stocks and produce. He entered heart and soul into the enterprise, without any motive except that of public interest. This fact was brought to my mind many years afterwards, when two of his boys applied to me for employment.

Very truly yours,

DAVID BROOKS.

RECOLLECTIONS OF THE EARLY DAYS OF
TELEGRAPHY.BY S. P. SWARTWOUT.

In the year 1847 I became associated with the small corps of operators who were employed by "The Magnetic Telegraph Company," as it was then named, in the office at Jersey City, New Jersey.

The line extended from Washington, D. C. to New York City (with interruptions by reason of the Delaware and Hudson Rivers) and, I believe, was the first and only telegraphic line then in existence.

The office consisted of two rooms in the second story of a building on Montgomery Street, located I think, on the second block west of the Hudson River. The instruments, two in number, were fixed in the front room which overlooked the street, while the batteries were arranged in the rear room, which was also used as a general storage room for all kinds of articles and fixings belonging to the office.

Of the operators employed there I remember the names of Edwards, Gregory and Glassbeck; the latter also kept the books and the accounts of the office. I was then about nineteen years of age and was employed as assistant operator and copyist. There was another operator I think, named Parke.

The business of course was in its infancy and of small amount compared to what it subsequently became. The Morse instruments were used, with clock-work which carried the strip of paper under the pen or point, which made the indentations standing for the letters of the alphabet. This clock-work was run by a heavy weight and when it ran down to the floor the operator had to take a key and wind it up.

During the session of Congress the telegraphic reports of its proceedings were daily transmitted over the wire to the New York papers, principally the "Herald," "Sun" and "Tribune"; and while they were coming we were pretty busy and were kept at work until near midnight in order that the papers could have the latest news. As it was not thought possible then to telegraph over a large river or other body of water, the method in use was to telegraph by wire from Washington to the Philadelphia office, where the message was re-written and carried across on the ferry by messenger boys to the office on the east bank of the Delaware River; whence it was again transmitted by wire to the Jersey City office where it was again re-written and carried over the Hudson River on the ferry boat by messenger boys and delivered in New York City; or if addressed to some place out of the city, then it was taken to the New York Telegraph office and mailed to its destination. So much re-writing of messages and ferrying caused considerable delay, so that the speed of transmitting messages would not compare with the present service; but it was far in advance of the mails and was then thought wonderful.

There were several messenger boys employed at the Jersey City office for carrying messages, at low wages. The hours for business were nominally from eight A. M. to six P. M.; but during the sessions of Congress, the office was run until twelve at night for the reception of the congressional reports. This extra work was done by two operators on alternate nights, one to take the message and one to write it off, and, as the messenger boys were let off duty at six o'clock, one of the operators had to carry over the reports to the newspaper offices on the last ferry boat, which then left Jersey City at 12 o'clock, midnight, and did not resume the trips again until morning.

The operator who went over with the dispatches for the newspapers on the last trip of the ferry boat, was obliged to stay in New York the rest of the night and return in the morning. Many nights have I performed this duty, going up by dark stairways to the pressrooms of the "New York Sun," "The

Herald" and the "Tribune" after midnight, and then to a hotel for lodging till morning. We received extra pay for the night work and our hotel expenses were also paid.

The active business manager at that time was Mr. J. M. Clark, who was the Secretary and Treasurer of the Company. His office was, I think, on Front Street, on the east side of New York; he being also engaged in the shipping business, and kept the books of the Telegraph Company in his private office.

A few years later the telegraphic wire was carried over the Hudson River, by means of high poles erected at Fort Washington and Fort Lee on opposite sides of the River, and then the business was wired directly to the New York office, thus saving all the rewriting and ferrying, and also adding materially to the rapidity of transmitting messages.

Thus from so small a beginning, the great telegraphic business of to-day has grown. It seems most marvellous to one who knew its birth, when he contemplates and realizes the vast system of the present time, with its world girdling wires, under oceans and over mountains, reaching to every land, and giving us the entire news of the world in our daily papers on the very day of its occurrence. Truly we live in an age of wonders.

This instalment of the Records of the Telegraphic Historical Society of North America includes pages 35 to 125. Pages 1 to 34 have already been sent to members; additional pages will be sent as fast as published, and an index will be furnished when volume is completed. Mr. Lockwood's historical paper will be finished in the next instalment.

All persons receiving these papers are requested to inform the Secretary if any inaccuracies are discovered and to contribute additional information on any subject relating to the work of the Society.

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