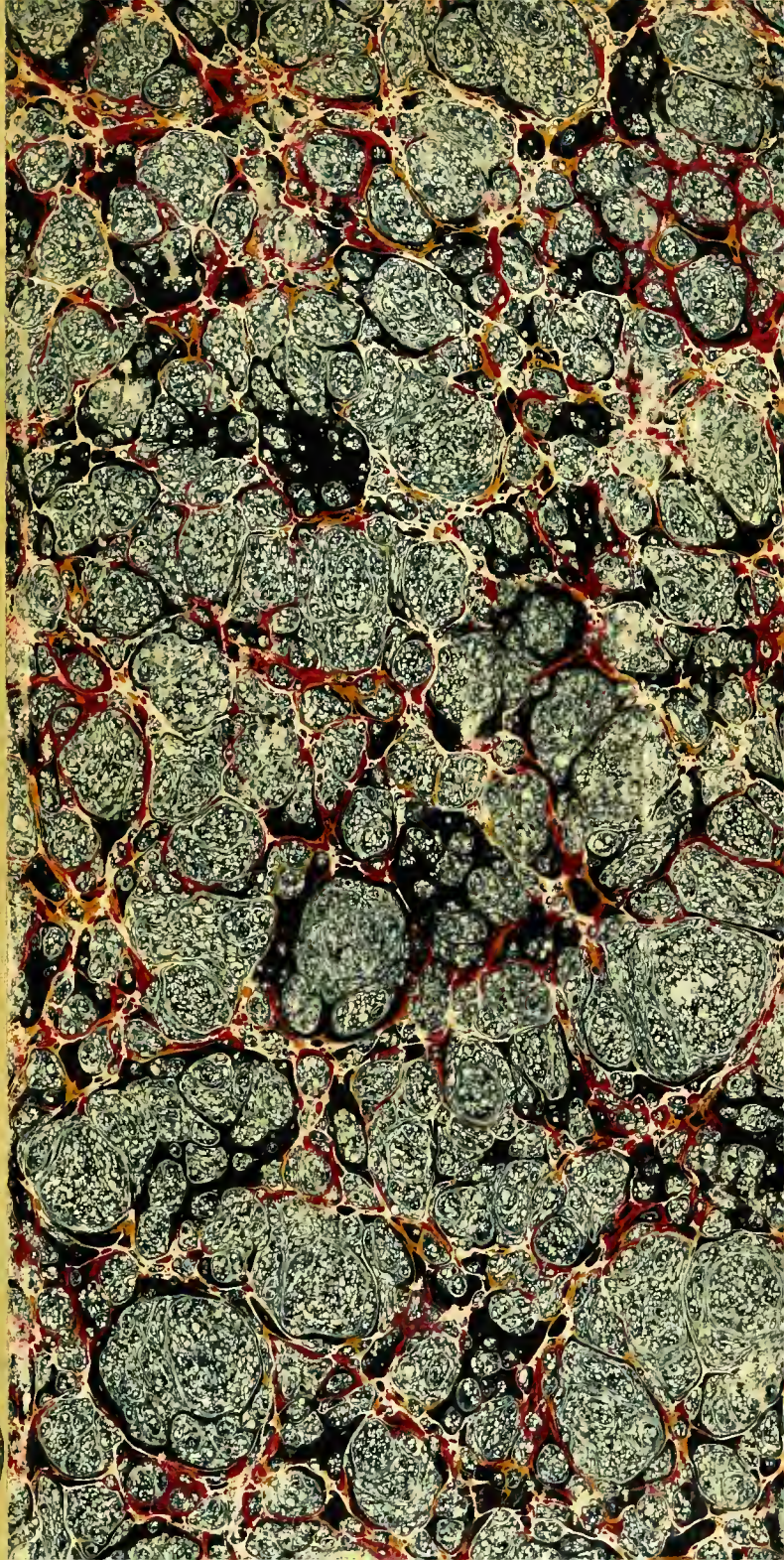


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PNEUMATIC-TUBE SERVICE.

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POSTMASTER-GENERAL

TO

CONGRESS, RELATIVE TO THE INVESTIGATION OF PNEUMATIC-
TUBE SYSTEMS FOR THE TRANSMISSION OF MAIL,
AUTHORIZED BY THE ACT OF JUNE 2, 1900.

To *Sibley College*

WITH COMPLIMENTS OF

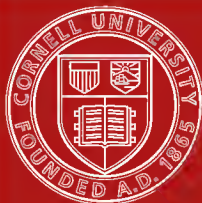
R. H. Thurston

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PNEUMATIC-TUBE SERVICE.

REPORT

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U.S. - Post Office Department.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.

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OFFICE OF THE POSTMASTER-GENERAL,
Washington, D. C., January 4, 1901.

SIR: I have the honor to report the results of the investigation into the pneumatic-tube service for the transmission of mail, instituted in accordance with the provision of the act of Congress making appropriations for the service of the Post-Office Department, approved June 2, 1900, as follows:

For the investigation by the Postmaster-General of the cost of construction, operation, and utility of all systems of pneumatic tubes for the transmission of mail, including full details and maps, and any estimates and proposals as to cost of construction, as well as the cost of stations and their operation, and all facts bearing upon the use of said tubes in connection with the mail service, to enable Congress to determine whether the service should be owned, leased, extended, or discontinued by the Government, also the cost at which the Government may acquire existing plants or necessary patents, ten thousand dollars.

The investigation was directed to be made in eleven cities, namely, New York, Brooklyn, Boston, Philadelphia, Washington, Cincinnati, Chicago, St. Louis, New Orleans, Denver, and San Francisco. In the hearings before Congressional committees twenty-seven cities had made application for the pneumatic service, but it was not deemed necessary or expedient to make the examination in all, and the cities named were selected as fairly representative. After full consideration of the points to be determined and the practical method of reaching them, a careful plan of investigation was mapped out. It was provided that in each of the cities selected a preliminary examination should be conducted by the postmaster and the division superintendent of Railway Mail Service as to the cost, utility, and expediency of the pneumatic-tube service, and as to the advisability of its extension where it already exists or of its adoption where it has not yet been tried.

The plan next contemplated a thorough scrutiny of the local reports by a first general expert committee representing the Department, who should visit the several cities successively with authority to employ local engineer experts, and should, in conjunction with the local committee, revise the preliminary inquiry, obtain estimates and proposals from pneumatic-tube companies, with plans and specifications of all

proposed extensions, and prepare such reports and recommendations as could command the approval and sanction of the joint committees. Finally, it was directed that all of the reports and information thus collected should be submitted to the investigation of a second general committee composed of citizens and experts of national standing, wholly unconnected with the Post-Office Department and with the pneumatic-tube companies, men of such high business character, professional training, and practical experience as specially qualified them to pass upon all of the questions involved and as certain to give weight and authority to their conclusions and recommendations.

The reports of these several local and general committees are herewith submitted to Congress, and they are commended to consideration as embracing a large volume of valuable information for the guidance of the legislative branch of the Government in acting on this subject. Attention is specially directed to the report of the second and final general committee, which was selected with great care with a view of securing an efficient representation of the best business, mechanical, and professional knowledge and experience. The chairman, Mr. Theodore C. Search, has for many years been president of the National Association of Manufacturers of the United States. Prof. Robert H. Thurston is director of Sibley College, Cornell University, first assistant engineer, U. S. N., and formerly professor of mechanical engineering of Stevens' Institute of Technology. Mr. S. Cristy Mead is assistant secretary of the Merchants' Association of New York, and especially recommended by that body. Mr. Alfred Brooks Fry is chief engineer and superintendent of repairs of United States public buildings, and Messrs. William T. Manning, Frederick A. Halsey, and Lyman E. Cooley are widely known as eminent consulting and mechanical engineers.

The report of this committee presents an intelligent and comprehensive answer to the inquiries embodied in the provision of Congress for the investigation. It reviews the exhibits and conclusions of the joint local committees and the first general committee representing the Department, and subjects their recommendations to the best tests of reasonable conditions and requirements which experience and practical wisdom can apply. It considers the feasibility and utility of the pneumatic-tube service as a permanent feature of the postal system; the conditions which should govern its maintenance and extension; the proper relation of cost to postal receipts; the ratio of expenditure which would be disproportionate to the benefits; the principles which should govern rental from private companies; the advantages of Government ownership, and the conditions under which it would be admissible and expedient.

It will be seen that the committee concludes that the cost of constructing a pneumatic-tube system, with full equipment and power

plant, should not exceed \$60,000 per mile for a line of 10 miles, and that, with allowance for interest and taxes, for annuity to cover depreciation and for net earnings at 3 per cent, but not including labor and power—operating expenses—the proper charge for annual rental would be \$65,761 for a line of 10 miles. Upon the assumption of Government ownership, the committee estimates that the annual charge would be \$39,725. It does not believe, however, that it would be wise to enter upon Government ownership until the system shall be further developed and material improvements shall be made. The system is capable of such improvements. It is yet, in some senses, in the experimental stage. Different devices, methods, and companies are coming into the field. None of these companies have yet offered better terms than the existing contractors, but the process of development is going on, and the committee believes that before the Government acquires possession it should have the benefit of the improvements certain to be made.

The cost at which Government ownership may be effected is not definitely determined, because it was impossible at this stage to secure proposals or terms of sale of existing or projected systems. The pneumatic-tube companies answered that without State legislation protecting their franchises which also covered commercial service, and without submitting the question to stockholders, they were not in a position to give figures for the disposal of the property. An approximate estimate may, however, be reached through the conclusion of the committee as to the legitimate cost of construction, and the physical value of the system. This cost will decline as improvements shall be made, and governmental control may secure local concessions and advantages not attainable by private companies.

The final general committee fully concurs in the recommendations of the local and first general committees for the extension of the service in New York and Philadelphia; it favors the proposed addition in Boston of the tube connection between the post-office and the South Terminal Station, and it approves a limited application of the service in Chicago and St. Louis. It holds that where the ratio of cost to gross receipts does not exceed $3\frac{1}{10}$ per cent, the service is not only justified but expedient. In the cases named the ratio comes within the limitation. In all the other cases examined the ratio passes the limit, and the recommendations are, for this reason, disapproved. There is a broad line of demarcation differentiating the two classes of cases. The committee advises that before new contracts are made new bids should be required, with an exaction of the lowest terms obtainable. It also recommends that all new leases should be accompanied by an option of Government acquisition when the conditions should be favorable.

The committee fully sustains the pneumatic method of mail transportation as a valuable and mechanically successful system, and gives effective illustrations of its importance to the business interests of the country in expediting mail communication. While the cost is great, the demonstrable advantage is proportionately greater. Besides, there are good reasons for believing that its maintenance and moderate extension in the large cities will stimulate an increased business which will pay its cost. The committee believes that the expense is capable of a reduction with the further progress of improvements, and it is unanimous in recommending the retention of the service as it now exists and its limited extension as specifically indicated.

In this view the Department concurs. In the great cities the pneumatic-tube service is too important and vital an agency of postal expedition to be abandoned. It is an instrumentality which, within reasonable limitations, has come to stay as a part of the modern system of communication. It can no more be discarded than the fast mail train. To strain every nerve to save half an hour or an hour on the railroad and then to waste half an hour which might easily be saved at the point of departure or destination would be incongruous and unwise. The fast mail train is employed only where the conditions justify it. And so the pneumatic-tube service is to be used only where in sound reason the importance and value of the result warrant it; but within these bounds, as the committee of eminent citizens shows, it is to be sustained.

The investigation intrusted by Congress to the Postmaster-General was conducted under the immediate supervision of the Second Assistant Postmaster-General, and I wish to express my appreciation of the ability and fidelity with which he discharged that duty.

I have the honor to be, very respectfully, your obedient servant,

CH. EMORY SMITH,

Postmaster-General.

The PRESIDENT OF THE SENATE.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

PNEUMATIC-TUBE SYSTEM FOR TRANSMISSION OF MAIL.

DECEMBER 29, 1900.

DEAR SIR: I have the honor to transmit herewith a full report of the investigation authorized by the act of Congress approved June 2, 1900, relative to the transmission of mail by pneumatic tubes. The investigation was conducted by the Second Assistant Postmaster-General under orders and instructions of the Postmaster-General. It was decided to give the investigation a threefold character.

1. Local investigation in each of the cities selected, to be conducted by the postmaster and the division superintendent of Railway Mail Service whose district embraced the city selected, this latter official having supervision of the dispatch of mails.

2. Joint review and revision of local reports by the local committee, assisted by the general expert committee representing the Department, who should visit the cities selected in order and have authority to employ expert local engineering talent, if necessary, secure estimates from pneumatic-tube companies, accompanied with plans, specifications, and other necessary data, and prepare such reports as could be signed by the members of the local and general committees. This was substantially the method which has uniformly been employed by this office when arranging for contracts under appropriations authorized by Congress.

3. Final review of all data collected by the Department as a result of its investigation by a committee of experts of national reputation, not connected with the Post-Office Department nor in any way interested with pneumatic-tube companies, and yet persons who, by reason of talent, education, and practical experience in dealing with questions of similar character, might be deemed specially fitted to give the most intelligent and impartial advice to the Department and to Congress touching the practicability of the transmission of mail by pneumatic tube, the reasonableness or otherwise of the estimated expenditures needful for the installation and operation of the tubes, and in general the public utility of such a service as related to the expedition and proper handling of the great bulk of first-class mail in the large cities of the country in which the Government assumes a monopoly and permits no interference by private or corporate carrying companies, however progressive they may be. It is with great satisfaction that I invite attention to the very able report of this last committee of seven experts, one of whom especially represents the manufacturing interests of the country, another the mercantile, and five represent various schools of civil and mechanical engineering. One of the seven resides

at Chicago, one at Baltimore, one at Ithaca, one at Philadelphia, two at New York, and one at large, a passed assistant engineer, United States Navy, temporarily stationed at New York.

This committee state that their report "is not merely a majority report, but that it is unanimous. No difference of moment regarding any of the conclusions reached exists among the members of the committee."

In the concluding section of this report, section 10, entitled "Résumé," the committee says:

(1) This committee finds the pneumatic method of mail transportation a novel, a valuable, and a mechanically successful system, ingeniously elaborated, and practically adapted in an admirable manner to the purposes of the Post-Office Department.

(2) The committee finds the system of immense advantage to the business interests of the country in its facilitation of mail transmission, both locally and generally, throughout the United States.

(3) The cost of this advance in postal methods is found to be necessarily large, but yet to be productive of more than proportional advantage in the large cities.

(4) The Government, through its responsible officials, should be the final judge of the extent of ultimate adoption.

(5) The committee advises the retention of all existing plants, and would recommend extensions in a limited number of cases, as specified in the body of this report.

(6) The cost of the pneumatic service is believed to be capable of some reduction, and of very considerable reduction with the further progress of improvement.

(7) It is recommended that the contracts hereafter made should be based upon proposals including exact specifications in detail with all required maps and plans, and capable of precise verification by the expert advisers of the Government.

(8) Ownership by the Government is considered desirable whenever the systems adopted have passed the experimental stage.

(9) A correct system of estimation of a proper rental is advised, and an illustration of such a method is given.

(10) Leasing is admissible under special conditions, described in a general way in the body of this report.

(11) Systems adopted should be as far as practicable standardized, and in operation interchangeability of mail packages therein should be secured.

(12) The system of rental on the basis of a stated percentage of construction cost is condemned.

(13) The Post-Office Department should be given precedence in assignment of space in the United States public buildings where post-offices are located, when such space is needed for essential machinery and apparatus and their accessories.

(14) Certain general principles, as specified in this report, should be adopted and adhered to in the decision of questions bearing upon the introduction of such improvements as are here discussed, and in extension and further improvements.

These conclusions are fortified by facts and figures, which are admirably arranged and presented in the body of this report and are substantially in accord with the previous recommendations and practice of this office.

The Postmaster-General's order No. 989, dated August 13, 1900, directed the manner in which this investigation should begin and be conducted by this office, and reads as follows:

The act of Congress making appropriations for the service of the Post-Office Department approved June 2, 1900, authorizes and directs the Postmaster-General to investigate and report to Congress in relation to the pneumatic-tube service as follows:

"For the investigation by the Postmaster-General of the cost of construction, operation, and utility of all systems of pneumatic tubes for the transmission of mail, including full details and maps and any estimates and proposals as to cost of construction, as well as the cost of stations and their operation, and all facts bearing upon the use of said tubes in connection with the mail service, to enable Congress to determine whether the service should be owned, leased, extended, or discontinued by the Government; also the cost at which the Government may acquire existing plants or necessary patents, \$10,000."

Investigations will be conducted in a few of the principal cities of the country, and in each of these cities the postmaster, assisted by the superintendent of the Railway

Mail Service in whose division the city is located, will proceed at once to a careful local investigation as to the necessity for a pneumatic-tube service for the transmission of mails or for the proper extension of the same where it now exists, having special reference to the volume of mail passing between the points where the installation of the service may be recommended, the size of the tube deemed necessary for present and prospective demands of the postal service, the space that may be available at terminal points and intermediate stations for the installation of the plant, the most economical and practicable system, both as regards installation and maintenance, and all other facts pertinent to the general investigation contemplated by Congress. It is not assumed that the local committee, constituted as above, will necessarily report favorably upon the installation of any system of pneumatic tubes, but they will, on the contrary, prepare their report with reference to the needs of the service and the best interests of the Government, giving due consideration to the question as to whether the carriage of mail by pneumatic tube or other similar device should be recommended between any given points. These investigations may include the possible use of single lines of small tubes as feeders to the trunk lines, and the question as to whether additional postage could be collected on first-class matter transmitted through the tubes.

As soon as the local committee has completed its investigations and is ready to submit a report the postmaster will notify the office of the Second Assistant Postmaster-General, and as soon thereafter as convenient a general committee of experienced postal officials, representing the Department, will be sent on the ground to make a thorough review of the investigation and of the report, in connection with the local committee, and after reaching conclusions satisfactory to a majority of the members of the local and general committee a joint report will be prepared by them and forwarded to the Department, accompanied with maps, plans, and specifications, fully describing the service which may be recommended.

Before submitting a report the joint committee in each case will consult, and if deemed necessary employ, expert civil and mechanical engineers to assist in the work, the authority for employment of experts having first been secured from the Department on a statement of cost.

While it is desired that all information pertinent to the general investigation ordered by Congress may be secured through one or more of these local reports, to be signed by the joint committee, care should be taken to avoid any unnecessary repetition or duplication of general information. The members of the general committee will be advised at once of their selection and will hold themselves in readiness to take up the local reports when called upon by the office of the Second Assistant Postmaster-General in the order designated by him.

It is desired that the work proceed with as little delay as possible and that the reports be filed in the Department at the earliest date practicable.

The necessary expenses incurred in connection with these investigations under the post-office act will be paid out of the appropriation therein made for this purpose.

Complying with this order, the following 11 cities were designated for examination as to the necessity for pneumatic-tube service: Boston, New York, Brooklyn, Philadelphia, Washington, Cincinnati, Chicago, St. Louis, New Orleans, Denver, and San Francisco. These particular cities were selected, not because they were believed to offer as a whole the most favorable conditions for the installation of pneumatic-tube mail service, but because they were fairly representative, by reason of location and importance, of the entire number of cities (27 in all) referred to in the hearings before Congressional committees preceding the legislation authorizing an investigation. The Department had in no wise committed itself to the policy of installing the pneumatic-tube service in all of these cities, but deemed it proper that investigations should be conducted in the 11 selected. It was thought that certain tests applied to them would be productive of like results if applied to other cities of the country similarly situated.

The local committees provided for in the above order were as follows: For Boston, George A. Hibbard, postmaster; Edward J. Ryan, superintendent, Railway Mail Service. For New York, Cornelius Van Cott, postmaster; V. J. Bradley, superintendent, Railway Mail Service. For Brooklyn, Francis H. Wilson, postmaster; V. J. Bradley, super-

intendent, Railway Mail Service. For Philadelphia, Thomas L. Hicks, postmaster; V. J. Bradley, superintendent, Railway Mail Service. For Washington, John A. Merritt, postmaster; C. W. Vickery, superintendent, Railway Mail Service. For Cincinnati, Elias R. Monfort, postmaster; O. T. Holloway, superintendent, Railway Mail Service. For Chicago, Charles U. Gordon, postmaster; E. L. West, superintendent, Railway Mail Service. For St. Louis, F. W. Baumhoff, postmaster; Still P. Taft, superintendent, Railway Mail Service. For New Orleans, J. R. G. Pitkin, postmaster; L. M. Terrell, superintendent, Railway Mail Service. For Denver, J. C. Twombly, postmaster; Still P. Taft, superintendent, Railway Mail Service. For San Francisco, W. W. Montague, postmaster; H. P. Thrall, superintendent, Railway Mail Service.

The general committee mentioned above was composed of officers selected from three of the largest post-offices in the country, all of whom had long and honorable careers in the postal service and were then serving in the capacity of superintendent of mails. This committee was composed of J. M. Masten, chairman, Brooklyn; E. W. Alexander, Philadelphia, and J. A. Montgomery, Chicago. Mr. Masten was named as chairman of the general committee for the reason that previously, while directly connected with this office as an assistant superintendent of Railway Mail Service, he had been designated to inspect and report upon the original installations of pneumatic-tube service in Philadelphia, Boston, and Brooklyn, and was, therefore, well equipped for the more recent and responsible duties assigned him.

Owing to the severe illness of Mr. Montgomery, which occurred during the latter part of the investigation, several of the reports were not considered and signed by him as a member of the committee.

The local committees immediately commenced the investigations, collecting data and statistics for their respective cities bearing upon the most feasible and economical system of pneumatic-tube service, and when ready to submit reports notified this office, and the general committee was sent upon the ground to go over the work already done, and, together with the local committee, formed a joint committee, which submitted a specific report to the Department, accompanied with propositions from competing pneumatic-tube companies, specifying the cost of construction, operation, and rental, and, where possible, these propositions were itemized, showing cost of laying pipe line, cost of stations and line equipment, power plants, and the cost of power and labor necessary to operate the system. By this method the most exhaustive consideration of the various facts bearing upon this service was secured, and where the local committee had not fully brought out all phases of the subject the joint committee developed it. The general committee, exercising a supervision over all the cities and acting as referee, was in a position to give the fullest consideration to the subject and to make the report of the joint committee for each city uniformly comprehensive.

The investigations of the local committees proceeded until October 1, 1900, after which the general committee made personal investigations in the several cities in the following order:

Washington, Boston, Chicago, St. Louis, Cincinnati, New Orleans, San Francisco, Denver, New York, Brooklyn, and Philadelphia.

The reports of the joint committees were forwarded to this office as they were completed, the final one from Philadelphia not being received until December 6, 1900. These reports show, in concise form, the principal features of the mail service in each city and the means necessary to effect the improvements desired, as well as the volume of mail, its importance, the revenue derived therefrom, and other pertinent facts bearing upon the question.

After the officials of the postal service had completed their investigations the following-named persons were appointed the expert committee hereinbefore referred to:

Theodore C. Search, Philadelphia, chairman; Robert H. Thurston, Ithaca, N. Y.; S. C. Mead, New York; Alfred Brooks Fry, New York; William T. Manning, Baltimore; Frederick A. Halsey, New York, and Lyman E. Cooley, Chicago.

In compliance with the order, this committee organized in Philadelphia December 10, 1900, at 2 o'clock p. m., and delivered its report to the Department on December 21, 1900, and it is herewith submitted, together with the reports of the joint committees, including maps, estimates, plans, and other data secured during the progress of the investigations.

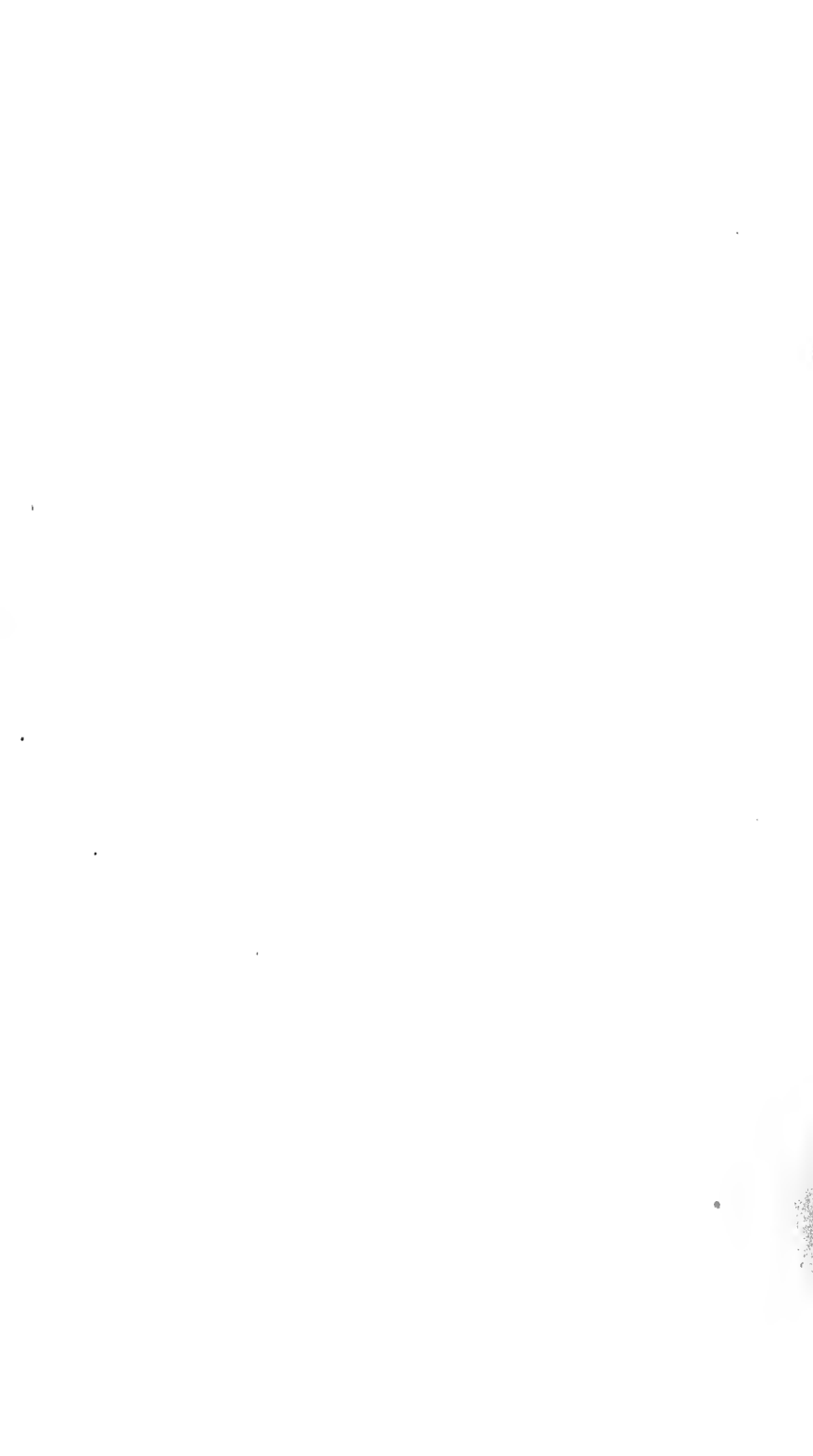
In connection with the investigation by the local committee, it was found to be advisable that these committees for the cities in which tube service was not in operation visit the cities where the tubes were in use and observe their operation, in order that they might be the better able to judge of their utility for the purpose proposed. These committees, under the authority of the Postmaster-General dated September 14, 1900, reported in Boston September 24, 1900, and visited successively New York, Brooklyn, and Philadelphia.

Previous to the commencement of the investigations, as stated above, William R. Kerr, of Chicago, Ill., was authorized by the Postmaster-General to make a preliminary investigation, and report as to the use of pneumatic tubes in the performance of mail service. The report of Mr. Kerr was received on August 6, 1900, and is inclosed herewith.

Very respectfully,

W. S. SHALLENBERGER,
Second Assistant Postmaster-General.

HON. CHARLES EMORY SMITH,
Postmaster-General.



REPORT OF THE COMMITTEE OF EXPERTS APPOINTED TO CONSIDER THE PNEUMATIC TRANSMISSION OF MAILS, PHIL- ADELPHIA, DECEMBER 20, 1900.

HON. CHARLES EMORY SMITH,
Postmaster-General, Washington, D. C.

SIR: The committee of experts appointed by the Postmaster-General to give consideration to all matters pertaining to the use of pneumatic tubes for the transmission of mail begs leave to submit herewith the report of its investigations.

SEC. I.—*Instructions to committee.*

The work of this committee was undertaken under authority of order No. 1858 of the Postmaster-General, dated December 5, 1900, as follows:

That Theodore C. Search, president National Association of Manufacturers, Philadelphia, Pa.; R. H. Thurston, director Sibley College, Cornell University, Ithaca, N. Y.; S. C. Mead, assistant secretary Merchants' Association, New York; Alfred Brooks Fry, chief engineer and superintendent of repairs, United States public buildings, New York, N. Y.; William T. Manning, consulting engineer, Baltimore, Md.; Frederick A. Halsey, mechanical engineer and associate editor American Machinist, New York, N. Y., and Lyman A. Cooley, consulting engineer, Chicago, Ill., be, and are hereby, appointed a committee of experts to give consideration to all matters pertaining to the use of pneumatic tubes for the transmission of mail and to advise the Postmaster-General thereon, pursuant to the act of Congress approved June 2, 1900.

Said committee will convene at Philadelphia at 2 o'clock p. m. on Monday, December 10, 1900, and remain in session for a period not exceeding ten days.

Each member shall receive as full compensation \$250 and his necessary expenses.

The chairman is authorized to expend a sum not exceeding \$300 for secretary, stenographer, and incidental expenses.

CH. EMORY SMITH, *Postmaster-General.*

The instructions governing the work of this committee are embodied in the following clause of the Post-Office appropriation bill for the fiscal year ending June 30, 1901:

For the investigation by the Postmaster-General of the cost of construction, operation, and utility of all systems of pneumatic tubes for the transmission of mails, including full details and maps, and any estimates and proposals as to cost of construction, as well as the cost of stations and their operation, and all facts bearing upon the use of said tubes in connection with the mail service, to enable Congress to determine whether the service should be owned, leased, extended, or discontinued by the Government, also the cost at which the Government may acquire existing plants or necessary patents, \$10,000.

The committee held its first session at No. 32 South Broad street, Philadelphia, Pa., at 2 o'clock p. m. on December 10, 1900, and proceeded at once with the work.

By direction of the Postmaster-General Mr. J. M. Masten, chairman of the committee of postal officials, appointed to collect data relative to the pneumatic-tube postal service, attended the sessions of the committee with the full results of the investigations already made and this material formed the basis of this committee's work.

SEC. II.—*Summary of evidence supplied to the committee.*

The evidence submitted to this committee consists:

First. Of the several reports to the Post-Office Department by the joint committees of postal officials relating to the actual or proposed pneumatic services of the larger cities.

Second. The printed statement of the postmaster of Philadelphia and similar statements in manuscript accompanying the reports of the several joint committees, particularly New York and Chicago, regarding the pneumatic system of mail transmission and related matters.

Third. Certain tabulated data, collated from the preceding documents and other sources, which give this committee a concise presentation of the principal facts bearing upon the question in hand.

Fourth. An exceedingly valuable mass of detailed information furnished the committee, verbally, on its demand by various representatives of the Post-Office Department.

Fifth. Information obtained by the committee by personal inspection of New York and Philadelphia plants.

Sixth. Matter descriptive of the construction actually in use for accelerated transmission, with maps and plans, supplied to the various committees and to this committee.

SEC. III.—*Summary of the reports of the joint committees.*

Boston.—The "joint committee" advises the extension of the service to the South Terminal station, and considers possible an extension to the Back Bay office, with an alternative of renting a privilege for, say, ten minutes in each half hour, of the commercial line there operated. The new lines are advised to be made 6-inch.

The proposed rental is \$83,034 for an 8-inch line to the South Terminal, and 6-inch extensions, with \$3,300 additional if a 10-inch tube is adopted. The committee would have the figures submitted verified by experts.

Reductions are thought possible to the extent of one-half of the estimated \$25,585 for power. The business of the South Terminal station would affect 50 per cent more material than is now transferred over the line to the north station. The present cost of pneumatic transmission is stated as \$65,000, and the cost of the extended system is estimated at \$132,000, practically double. Credits against the larger figures are estimated as incidental to the use of the system amounting to \$78,000, and the difference, \$54,000, is to be charged against the accruing advantages of this method of transmission, including a probable stimulation of the postal business.

Philadelphia.—The "joint committee" reports the following propositions from the Pneumatic Transit Company:

(1) The introduction of seven connections, aggregating 7.657 miles, at a cost of \$114,907.93 annually.

(2) The adding of ten connections, aggregating 12.5 miles, at \$162,996.17 annually.

(3) Adding fourteen connections, aggregating 19.49 miles, at \$221,617.60 annually.

It was concluded that these costs were prohibitive except in the case of the first proposition, which would affect 83.5 per cent of the total business of the Philadelphia post-office, or 87 per cent of the first-class mail originating in that city. This proposition was considered worthy of consideration. It was thought, however, that the figures submitted by the proposing contractors were probably 25 to 33 per cent too high.

It was believed that the costs should be reduced by the installations practicable within the post-office building to the extent of \$36,000, and the balance, less 20 per cent, makes a net possible saving of \$56,306.15, less \$42,128, or \$14,178.15. The 10 per cent allowance on construction account was stated to be reducible by that portion chargeable to engineering and office expenses, to licenses and royalties. It was thought that the number of operatives might be reduced one-half and a saving thus effected of \$9,100 per annum. The net cost ought not thus exceed a total of \$91,630.

Possible economies are pointed out, incidental to the use of the system, of \$99,000 per annum on the existing routes. Reduction of payments for special deliveries are advised from 8 to 5 cents. It is thought that the proposed continued charge of \$34,566 on existing plant could be somewhat reduced.

Chicago.—The report of the "joint committee" at Chicago indorses the local committee's report, and finds that the proposition of the Chicago Pneumatic Service Company is the most favorable to the Government of the four proposals received, and this involves the laying down of 8.78 miles of 8-inch tubes between the main office, three depots, and seven other stations. The estimated annual payment amounts to 10 per cent on the estimated costs of constructions, plus \$66,118 operating expense, a total of \$143,050.50.

The committee thought these figures substantially correct, except an estimate included of \$28,800, which was to cover cost of labor in stations. This could be probably reduced to a considerably smaller sum by utilizing the services of clerks already employed in the stations. It was thought that a 10 per cent basis on the total charge against construction account was inequitable, and it was concluded that a 5 per cent basis would be more just, reducing the annual charge as rental to \$116,989, or \$13,325 per mile. On this basis the committee thought it wise to recommend the proposed installations and anticipated a possible later reduction of charges to a total of \$100,000 annually.

Possible savings were estimated by reduction in the costs of wagon service of \$10,000 per annum, by a similar amount in costs of carriers, and by economy in reduction of railway service \$5,000, a total of \$25,000. It was advised to reduce next the payment for special delivery from 8 to 5 cents. All economies included, the net increase produced in the costs of transportation would thus be made \$80,000 per annum in Chicago by the proposed service, which increase is to be set against its manifold advantages to the public.

San Francisco.—The investigation at this point results in the advising of lines 2.65 miles in length, at a cost in annual rental of \$60,924, which gives a possible net outgo of \$46,311 after deductions of savings. The situation is found to be very opportune for the introduction of the system, and it is anticipated that at least one-half of the total mail transportation in the city may be carried on by this service. Eight-

inch tubes are proposed, effecting further economies in the wagon transportation, clerical services, and other details of something like \$10,000. Construction of the lines planned is strongly urged by the joint committee.

Cincinnati.—The committee on the Cincinnati installations reported that, in the opinion of its members, the estimates submitted for the proposed service in that city were not approved, but that the introduction of the service was eminently desirable. The line was to be 6.61 miles in length, at a cost, as estimated, of \$636,462. The annual rental, including 10 per cent on the construction account, was estimated at \$110,731.

That committee had inspected the conditions of the service in New York and Brooklyn and in Philadelphia and Boston, and considered those installations to be satisfactory.

St. Louis.—The committee on this city reports as routes considered:

- (1) Post-office to Union Depot, 8 inch.
- (2) Post-office to Relay, 8 inch.
- (3) Six miles of line on Broadway, north and south, 6 inch.
- (4) Union Depot west to residence quarter, 6 inch.

The total proposed amounts to 12.78 miles of line.

The committee could not revise the construction account estimates in detail, but they were thought high. It was advised that the Department secure its own estimates independently. The total costs were given as estimated at \$876,320. The rental proposed was 10 per cent on this sum plus the cost of operating—a total of \$157,672.

Operating figures were thought correct except as to labor, which it was thought could be reduced, by utilizing the services of clerks, by about \$18,600. The total rental, on the basis of the proposition of the Batcheller Company, reduced to meet the views of the committee, was reported as \$111,445 per annum, and this was approved.

The figures reported were found to be 34 per cent of the net profit on local business. The present cost of transportation in that city is given as \$54,352, or one-half of the above minimum estimate. Possible economies incidental to the use of the system in St. Louis are figured at \$25,000.

New York.—The joint committee discusses a proposition for the installation of 18 miles of new line, at a cost of \$925,000, and assumes a five-year contract. The rental proposed is \$398,500 annually for the new and the continuance of existing tube service. A mixed mail and commercial service had been suggested, but this the committee does not consider permissible. The proposition involved the connection of 21 stations and the main office. The figures of \$398,500 included all costs of operation. The reasonableness of this figure is considered to be outside the province of the committee and to be determinable only by engineering experts.

In detail this amount consists of \$136,000 for power; \$60,000 for wages of station operators; \$18,500 for local taxes, and \$184,500 for interest, renewals, and administration and incidental expenses.

The present service of 5.18 miles in that city costs \$167,100, or \$33,420 per mile, per annum. The estimates for the total extended service is stated as \$398,500 for 23 miles, or \$17,326 per mile per annum. This is 54 per cent of the present mileage charge.

Possible economies incidental to the use of the pneumatic system as proposed, as by reduction of wagon service, elevated railway service,

and incidental savings, are reckoned at \$101,052; gains by stimulated correspondence and postal business, and by reductions of charges for special deliveries from 8 to 5 cents, \$24,000; by reductions of cost of delivery, \$16,000; by reduction of clerical force, \$15,000; total, \$156,052.

The net increase of costs is reckoned thus as \$75,348, which amounts to but 6 per cent of the net local revenue of the New York office. On this basis the joint committee recommends to the Department that the proposed extension be undertaken.

Brooklyn.—The subject was investigated in Brooklyn by a special "joint committee," which, revising the report of the local committee, approved the recommendations of the latter committee. This contemplated the construction of seven new connections, amounting to 13.5 miles, at a cost of \$172,097; or of five such connections, amounting 8.88 miles, for \$138,113; or of two connections, amounting to 5.17 miles, at \$105,999 per annum, each conditional upon the proposals proving on investigation to be reasonable. A fourth proposition involved the same constructions as the third above, with Station A added, at a figure of \$102,000. All proposals included the continued operation of the existing system, which is the connection now in operation between New York and Brooklyn.

The committee reported that they considered the figures submitted them as above large, and suggested 6-inch tubes in the extensions if adopted. The committee thought the present service valuable and advised its continuance. It was, however, considered that the new estimates for that service were too high and that the figure of \$41,676 should be reduced to more nearly \$20,000 plus the cost of power.

SEC. IV.—*Information collated from various sources.*

An examination of the reports of the joint committees and of the various papers attached thereto discloses the fact that from the 11 cities selected by the Post-Office Department for inspection in connection with the proposed installation of tubular mail service the joint committees, after careful consideration, eliminated 3, namely, Washington, New Orleans, and Denver. In each of the remaining 8 cities the committees recommend to the Post-Office Department that a system of pneumatic tubes for transmission of mails be installed, or the present systems extended, and submit to the Department for consideration proposals and estimates for the service recommended in each city as summarized in the foregoing section. The following table sets forth the details of those proposals and estimates, together with the cost of construction and operation as estimated by the joint committees, as well as certain possible economies which, in their judgment, would ensue from the establishment of the tubular systems as recommended in those cities.

TABLE I.

City.	Length.	Size of tube.	Rental proposed by bidding company, including existing service.	Proposition as revised by joint committees.
	<i>Miles.</i>	<i>Inches.</i>		
Boston	0.71	8		
Do .....	.74	8		
Do	1.37	6	\$83,034.80	\$70,252.00
New York	23.31	8	398,500.00	398,500.00
Brooklyn	10.53	8	c 138,113.00	138,000.00
Philadelphia	7.65	6		
Do .....	.52	6		
Do .....	.94	8	149,473.93	126,196.00
Cincinnati	4.26	6		
Do	2.38	8	101,561.80	80,230.00
Chicago	8.78	8	143,050.52	116,989.00
St. Louis	9.31	6		
Do	3.16	8	157,680.52	111,045.00
San Francisco	2.44	8	60,924.66	48,609.66
Total	71.88		1,232,339.23	1,089,821.66

City.	Rental per mile of length.	Mail stations connected.	Depots connected.	Per cent of first-class mail originating in tube districts.	Per cent of revenue received in tube districts.
Boston	\$31,200	2	2	80	75.0
New York	17,326	22	1	90	96.7
Brooklyn	13,105	6		85	82.0
Philadelphia	13,844	9	2	87	83.5
Cincinnati	12,140	4	3	90	85.0
Chicago	13,325	10	3	67	89.0
St. Louis	8,720	10	2	90	95.0
San Francisco	19,900	4	2	80	82.0

City.	Competing proposition submitted but not recommended by joint committees.	Cost of construction estimated by company.	Cost of operation estimated by company.	Cost of construction estimated by committees.
Boston		\$186,936.00	\$64,348.00	
New York		1,458,480.00	252,652.80	
Brooklyn		(a)	(a)	
Philadelphia		563,061.00	59,601.77	b \$526,605.00
Cincinnati	\$125,269.00	522,267.96	49,335.00	500,000.00
Chicago	218,920.00	769,325.24	66,118.00	740,025.00
St. Louis	188,283.00	876,355.17	70,045.00	600,000.00
San Francisco	50,917.00	252,247.31	35,699.93	232,091.31
Total	578,389.00	4,628,673.18	596,794.50	2,598,721.31

City.	Cost of operation, estimated by committees.	Possible economies, wagon, electric car, or special mail messenger.	Cost of existing tube service.		
			Length.	Size.	Annual rental.
			<i>Miles.</i>	<i>Inches.</i>	
Boston	\$51,549	\$7,000	0.74	8	\$9,000
New York		158,452	5.29	8	158,500
Brooklyn		19,500	1.65	8	20,200
Philadelphia	49,502	42,216	.94	8	34,566
Do .....			.52	6	
Cincinnati	33,735				
Chicago	46,118	35,400			
St. Louis	51,445	23,391			
San Francisco	25,300	10,000			
Total	257,649	295,959			223,266

a Company's estimate not received.

b Not including cost of existing service; 20 per cent additional decrease deemed possible.

c Three other bids were received.

In this connection it is interesting and instructive to note the relative financial importance of the post-offices in these 8 cities. The following table is compiled from the data contained in the reports of the local and joint committees by Mr. J. M. Masten, the postal expert designated by the Department to assist this committee:

TABLE II.—*Statistics of first-class mail.*

Post-office.	Pounds of first-class mail originating annually.	Per cent of local mail.	Pounds of local first-class mail annually.	Rate per pound received.	Gross "local" receipts annually.	Net per cent receipts turned over.	Apparent net "local" profits.
Boston, Mass.....	1,081,130	31.00	335,150	0.70	\$234,605.00	0.54	\$126,686.70
New York, N. Y.....	13,501,642	40.00	5,400,656	.39	1,906,255.00	.62	1,284,861.00
Brooklyn, N. Y.....	1,408,053	30.00	422,415	.80	337,377.00	.32	104,759.00
Philadelphia, Pa.....	3,470,659	35.00	1,214,730	.72	856,538.00	.52	446,000.00
Cincinnati, Ohio.....	1,205,636	39.43	475,382	.76	361,200.32	.61	220,387.09
Chicago, Ill.....	6,114,396	18.95	1,158,678	.62	718,380.36	.60	431,028.22
St. Louis, Mo.....	1,748,996	25.66	448,792	.75	336,594.00	.65	218,786.10
San Francisco, Cal.....	878,086	10.29	90,335	.90	81,319.50	.55	44,725.72

From an examination of the papers attached to the reports of the joint committees it would appear that the Boston, New York, and Brooklyn companies, whose proposals are recommended by the joint committees, are separate and independent, while the proposals recommended in the other five cities are made either by the Batcheller Pneumatic Tube Company, of Philadelphia, or by local companies operating under that system and apparently controlled by that company. In the three cities first named the proposals are made on the basis of an annual rental of a definite fixed sum per year, which is claimed to be based upon the cost of operation plus approximately 10 per cent on the actual cost of construction, but which is not to be varied should that construction prove to be more or less expensive than estimated. In the other cities the annual rental proposed is not fixed and definite, but is to consist of the cost of operation plus 10 per cent of the cost of construction, whatever that amount may prove to be on completion of the work, duly supervised and checked by engineers to be supplied by the Post-Office Department.

It further appears from reports of the local committees in the cities in which the tube service has been in operation, namely, Boston, New York, Brooklyn, and Philadelphia, that the service furnished by 8-inch tubes has proven adequate to convey all first-class mail, even during the busiest hours, without approximating its full capacity, and that in addition thereto considerable quantities of newspapers are being forwarded by tube in each of those cities, although that branch of the tubular service has not been developed, mainly owing to lack of space for the necessary rehandling of large quantities of paper mail; that the system has demonstrated its advantages over other systems of transmitting mails in its high relative speed, giving in some instances a gain of 91 per cent, in its freedom from delays incident to weather, parades, or riots, and in the impossibility of depredations of mails in transit. This gain in time, due to continuity and high speed, makes possible the actual delivery of incoming mails over a much larger territory by the same carrier delivery. It is the experience of each of these four cities that the establishment of this service has enabled the Department to decrease expenses in other directions, notably in the

number of messengers to cars, etc., and in the amount of car and wagon service, and that, being practically a continuous service, the element of congestion, so serious in these large offices, due to the periodical arrival of great quantities of mail, is prevented and the annoying delays incident thereto are avoided. This also permits the Department to obtain a greater degree of efficiency from a smaller clerical force than is possible when large quantities arrive at fixed intervals. The continuing character of the service performed by the tube has proven of great value in enabling the postal authorities to advance large quantities of mail at least one dispatch daily. In Boston the number is given as 10,925 letters, in New York 20,000, and in Philadelphia at least 30,000.

The data from the other four cities, namely, Chicago, Cincinnati, St. Louis, and San Francisco, indicate similar results to be obtained by the installation of the tubular service in those cities. Great stress is laid by all the reports upon the stimulating effect which this service will have, first, upon local first-class mail, and second, upon special-delivery matter, the two items in the mail service which yield the greatest relative return. It is confidently predicted by some of the local committees that the increase should be at least 100 per cent in the special-delivery class.

In this connection several of the local committees have considered the advisability of a special postage rate for first-class mail transmitted through the tubes; but it is the concensus of their opinions, based on their experience with other improvements in the mail service, whereby increased facilities have produced increased revenue, that no such special postage rate should be charged. On the contrary, they recommend that in the case of special-delivery matter it would be wise for the Government to pay the messengers who deliver these letters, for the immediate delivery of which an extra 10 cents is charged, 5 cents instead of 8 cents per letter in those districts served by the tubular system. This opinion rests upon the belief that the messenger would receive in the aggregate a greater return at 5 cents per letter, when delivering a large number at less distances, than he now receives at 8 cents per letter under the present conditions.

SEC. V.—*Description of systems.*

The following are brief descriptions of the various methods proposed for use by bidders to the various postal committees for accelerated transmission of mail:

THE BATCHELLER PNEUMATIC-TUBE SYSTEM.

Motive power.—The motive power is air at a pressure of about from 5 to 10 pounds on lines at present in use. The compressed air required may be furnished by any approved type of steam or electrically driven air compressor or high-pressure blower.

Runway.—The runway through which the carriers pass is cast-iron pipe, laid in a double line to accommodate traffic in opposite directions, bored true and smooth, consisting of pipe similar to a high grade of water pipe, and laid and jointed in a generally similar manner, though with much more care. Sizes of tubes at present in service under this system are 6 inches and 8 inches. Short corners are turned by brass

bends with a radius equal to 1 foot for each inch of diameter of line used. Bends are protected by shells of masonry.

Carriers.—The carriers used are cylindrical in form, having flat heads. The internal diameter of the carriers is about 1 inch less than that of the size of the tube used—i. e., 5-inch (internal diameter) carriers for 6-inch tubes and 7-inch carriers for 8-inch tubes. Length of carrier may be from 16 to 30 inches, and the weight ranges from 7 to 16 pounds, according to diameter and length of carrier used. The metal body of the carrier is not designed to come into contact with the interior of the tubes, each carrier being fitted with two packing rings of cotton fabric, secured by metal collars placed near the ends and lubricated with vaseline, the packing rings being made of a size to give an easy running fit in the tubes. Access to the interior of the carrier is given by having a door fitted to the full diameter at one end, the door being provided with a secure latching arrangement, which, in its present form, makes accidental opening practically impossible.

Dispatching apparatus.—Each station, which may be the end or an intermediate point on the line, is equipped for sending and receiving carriers. The sending apparatus consists of two sections of the tube supported in a swinging frame so arranged that either section may be brought into line with the main tube, through which a current of air under necessary pressure is constantly flowing. One of these tube sections is swung aside to receive the carrier. In dispatching, a carrier is placed in an iron trough secured to the transmitter, and it is then placed into the open tube section. The frame carrying the two sections is then swung into position, thus bringing the section containing the carrier into line with the main tube, when the carrier is swept along by the current of air under pressure. While the frame is swinging from one position to another the air is prevented from escaping by plates covering the end of the main tube, and a by-pass is also provided so that the air current is not interfered with.

An air cylinder furnishes the power to swing the frame, the operation requiring from two to three seconds.

In dispatching, to avoid accidents, necessary headway of from five to fifteen seconds is given each carrier. This may be controlled automatically by time lock or by hand.

Receiving apparatus.—Four forms of receivers may be used. They are here called the open receiver, the gate receiver, the closed receiver, and the intermediate receiver. The open and gate receivers are used when the pressure in the tube is only an ounce or two above the atmosphere, which condition occurs at the end of the tube farthest removed from the air compressor. This may be in the same building with the compressor when the outgoing and incoming lines are both operated from one station. The open receiver is the most recent form of operating device, and permits a smaller time interval between carriers than does the gate receiver.

The gate receiver contains an air cushion, formed by closing the end of the tube with a sluice gate and allowing the air under pressure to flow into a slotted branch pipe in the rear of the sluice gate. When a carrier arrives it passes over the slots, enters the air cushion, and is thus brought to rest.

For terminal stations where the air current arrives in one tube and returns by the other tube a closed receiver is used. This consists of a section of tube closed at one end, forming a receiving chamber. As

carriers arrive they run directly into this chamber and come to rest by compressing the air therein. The receiving chamber has one end connected to a piston in a cylinder, so arranged that the movement of the piston tilts the receiving chamber through an angle of 40 degrees to discharge the carrier and then returns it to a horizontal position.

The intermediate station receiver may be likewise automatic. As the main-line tubes pass through each station some device is necessary to turn aside the carriers destined for that station without interfering with those which are to go to points farther along the line. The automatic intermediate apparatus consists of a machine resembling a large wheel with a wide flange. The diameter of a small disk on the end of the carrier determines whether or not it will be discharged at a station where an automatic intermediate machine is located. If the disk is wide enough to span the space between two needles placed in the bottom of the receiving tubes an electric connection is established, the wheel revolves 45 degrees, and the carrier is discharged through a sluice gate into the station receiver. If the carrier is to go to a station beyond, the wheel of the intermediate apparatus turns through 90 degrees and drops the carrier into the main line, thus permitting it to continue to its destination.

Judging by actual experience at the Madison Square branch of the New York post-office, the automatic intermediate apparatus may be dispensed with, the pneumatic line in which this station is placed being from the general post-office to the Grand Central Station. A set of the receiving and dispatching mechanism is cut into the line at this station, the mechanism above named being substantially similar to that used at terminal stations, though in a form improved and compacted from designs by Mr. Blood, of the Tubular Dispatch Company, of New York.

In general.—The Batcheller Company does not recommend double-tube lines over 4 miles in length between relay stations, and states that initial air pressures below 25 pounds are most expedient to use. A carrier speed of from 25 to 33 miles per hour under actual working conditions is obtained on lines at present in service.

SYSTEMS OF THE AMERICAN PNEUMATIC SERVICE COMPANY.

Motive power.—The motive power of the Fordyce system operated by the American Pneumatic Service Company is compressed air at low pressure, supplied by any approved type of blower or compressor driven by steam or electric power.

Runway.—The runway for this line is made of cast-iron pipe usually laid in a double line to accommodate traffic in opposite directions. The pipe is simply a good grade of unbored cast-iron water pipe, laid in the ordinary manner with bell and spigot joints, ends of pipe sections, however, being machined to secure good contact.

The line which is in present use at Lowell, Mass., is 10 inches in diameter, the length being about 4,000 feet. Corners are turned by short bends of cast-iron pipe laid in sections. The radius is 1 foot for each inch in diameter of the pipe.

Carriers.—The carriers used are cylindrical in form. They range from 18 to 30 inches in length, and are about 9 inches in internal diameter. They are made of sheet steel, with phosphor-bronze heads. The heads are cast with 4 or 5 lugs, each lug holding a solid drop-forged

steel or hard bronze wheel. On these wheels the carriers run in the tubes. There is properly no actual contact between the body of the carrier and the pipe. Carriers now in use are fitted with doors in the sides, running substantially the length of the carriers between heads, and with width of openings ranging from 7 to 9 inches, the latter opening practically equal to the internal diameter of the carrier.

Dispatching apparatus.—The dispatching apparatus resembles in form a section of the line, being closed at the ends by valves. The movement of an operating lever works an auxiliary cylinder, which closes the outer valve and opens the inner valve, thus starting the carrier in the pipe and at the same time opening a third valve, which admits the current of air behind the carrier, propelling it along the line.

Carriers may be dispatched with a headway of from 6 to 15 seconds. The velocity varies from 25 to 30 miles an hour under service conditions at Lowell.

Receiving apparatus.—On arriving at the receiving apparatus the carrier opens an auxiliary valve, which admits a supply of air under pressure. This air in turn opens a valve in the receiving terminal and permits the discharge of the carrier, the air pressure being permitted to accumulate in advance of the carrier before discharge, thus gradually bringing the same to nearly a state of rest before the gate valve at the end of the line is opened. The accumulated pressure also operates mechanism which closes a valve in the receiving terminal after the carrier has passed out on a tray at the end of the line.

In general.—This system has been laid for commercial purposes in the city of Boston on a double line about $5\frac{1}{4}$ miles in length, the air pressure proposed for operation being 5 pounds or less.

The American Pneumatic Service Company also operates packed carriers in bored or brass tubes under Bostedo, Lamson, or other patents, using open end receiving and dispatching apparatus.

The size of tubes ranges from 2 to 5 inches in diameter on lines at present in use, the largest being installed at the United States navy-yard, Brooklyn, N. Y., and the United States appraisers' warehouse, New York, where 5-inch tubes are in service. This company also tendered for 6 and 8 inch tube installations, to be of the character as outlined above. The pressure carried on the small lines in use is from 2 to 10 pounds, and the speed obtained is from 15 to 30 miles an hour.

Both the Batcheller Pneumatic Tube Company and the American Pneumatic Service Company propose in their larger systems to use electrically driven air compressors or blowers, current to be generated in a central station conveniently located, and to be distributed by electrical conductors laid when tubes are put down; compressors or blowers to be located at stations in the line where most efficient.

SYSTEM OF THE UNITED STATES PNEUMATIC DISPATCH COMPANY.

Motive power.—The system of the United States Pneumatic Dispatch Company, in experimental use at Burlington, N. J., uses compressed air at a pressure of about 6 ounces above the atmosphere in the rear of the carrier, a steam-driven blower of ordinary type furnishing the pneumatic power.

Runway.—The runway of this system consists of cast-iron pipe in flanged sections, bolted together at the joints. The quality of the pipe

is similar to ordinary water pipe, but the sections are cast with longitudinal grooves at opposite sides of the inner circumference of the pipe, the sections being so put together as to bring these grooves continuously at the top and bottom of the pipe line, thus forming a runway for the wheels of the carrier hereinafter described.

The one curve in the experimental line is made by jointed sections of cast-iron pipe and has a radius of about 24 feet. The total length of the line in use at Burlington is about 2,000 feet.

Receiving and dispatching apparatus.—The receiving and dispatching apparatus of this system is substantially the same for each end of the line. It consists of an open tramway with an upper and lower rail to take the carrier wheels, a gate valve at the end of the continuous pipe line, and a section of pipe with a closed end, forming an air cushion.

In dispatching, the carrier, which has been placed in the open tramway, is propelled by hand into the tube, the gate valve is closed behind it, and by opening the discharge valve in the supply pipe from the blower the carrier is driven along the line. As the carrier nears the terminal at the other end a gate valve serves to prevent the escape of air, thus accumulating pressure in advance of the carrier and serving to bring it nearly to a state of rest by compression. When within a few feet of the end of the line the carrier automatically shuts a gate valve there placed, opens the gate valve in the end thereof, and slowly passes out on the open tramway, coming finally to rest in an independent section of tube at the end of the open tramway, where there is a final air cushion.

The carrier may be returned or driven in the opposite direction in the same line by repeating at the other end the process above described.

Carriers.—The carrier consists of a cylindrical sheet-steel car, having bronze and iron framing. The car is 3 feet long and 20 inches internal diameter and weighs about 400 pounds. On each end of the car are two wheels, an upper and a lower, which travel in the grooves formed in the runway, the wheels revolving in antifriction bearings secured to the wheel framing or "wings," the "wings" in turn being firmly attached to head framing or ends of the carrier. These wings are pivoted at right angles to the axis of the carrier in order that it may be readily accommodated to curves. The "wings" or framing at the ends of the carrier body form a nearly air-tight fit in the tube by a shield of sheet rubber, which runs almost in contact with the surface of the pipe. Access to the interior of the carrier body is given by a sliding door about 10 by 30 inches.

In general.—The air pressure carried in this system—i. e., 6 ounces—serves to give a speed of about 33 miles an hour. This speed can be readily increased, if desired, to 50 miles or more by an increase of air pressure.

It is stated by the representative of the American Pneumatic Dispatch Company that a line similar to the one heretofore described can be operated without relay for a distance of from 6 to 10 miles, according to the air pressure carried. This company is prepared to undertake, in connection with this system, the construction of switches and mechanism for intermediate stations, such apparatus being automatic in operation and generally resembling that described for use at the terminals. Carriers can be operated at headway of about 15 seconds.

THE FRANK ELECTRICAL SYSTEM.

Mr. Max. Frank presented to the local committee in Chicago a system which he described as an electro-pneumatic tube. The construction and method of operation, he stated, could not be described, since they were not yet patented.

THE SAMPSON COMBINED CURB AND CONDUIT SYSTEM.

The primary object of the Sampson combined curb and conduit system is to furnish conduits for electric wires, to contain piping, etc.

For use in cities the system named is constructed by removing the curbstones along a given street, and then digging a trench of any desired depth and needful width on the curb line.

In this trench is laid a series of vitrified tile ducts of required size and form and placed in tiers on and in a bed of concrete.

Sections of duct are jointed internally by a mandrel and externally by a sheet-steel casing, the curb and conduit containing the ducts being finally completed by Portland cement cast or applied in desired form to finish outside work.

The tile ducts contained in the conduits may be tapped at desired intervals or may be solidly continuous from end to end of the line.

In its application to the transmission of mails the bidder for this system proposed to install a duct or ducts rectangular in form, the duct or ducts to be located near the bottom of the proposed curb conduit, and to be of any desired size, 24 inches in diameter being suggested as the smallest proposed for mail-transit use.

Rails were to be laid and electrically operated motor cars were to be run. It was proposed to use cars weighing from 500 to 1,000 pounds, each car to carry from 500 to 1,000 pounds of mail matter.

SEC. VI.—*Advantages of pneumatic transmission compared with cost.*

Later in this report will be found a comparison of the cost of tube service in the various cities in which its installation is contemplated, with the postal revenues of those cities, and in order that this cost may be set against the advantages to follow the adoption of the service, we give here a résumé of those advantages.

In a general way it is understood by all that the object of the tube service and the compensation which it gives for its cost is the expediting of correspondence in transit between the addresser and the addressee. There are two sources of this saving in time, one of which is more apparent than the other. The first and more apparent source lies in the increased speed of the carrier in the tubes over the speed of present street service. In the case of the longest tube at present in service—namely, the one connecting the general post-office with the Grand Central Depot in New York, the total length of which is approximately $3\frac{1}{2}$ miles, this saving in time is 33 minutes. In the shorter tubes this saving in time is correspondingly less, while in the case of longest proposed tube—namely, the one to connect the general post-office with Branches J and L, in the Harlem district of New York—the saving will amount to 36 minutes. It is obvious that the amount of saving due to this source is dependent solely on the length of the route and the increased speed of the carriers over the present service.

The second and less apparent source of saving in time, although the one which is in most cases the more important of the two, is due to the fact that the service with wagons and street and elevated railways is intermittent, while the service with tubes is continuous. Except in New York, the most frequent present service between the general and the branch post-offices is that due to the hourly schedule of wagons. It is obvious that with wagons dispatched at hourly intervals a letter deposited in an office immediately after a dispatch of a wagon will be required to wait one hour for the next wagon, whereas with the tube service the letter would be dispatched immediately. Letters deposited at other intervals within the hour will be advanced correspondingly less, the average gain being obviously one-half of the schedule interval; that is, one-half an hour with the hourly service, one hour with two-hourly service, and so on, to which is to be added the gain due to the increased speed in transit.

A corresponding gain occurs at the other end of the route. The arrival of a wagonload of mail fills the sorting tables, and a considerable interval elapses before all the mail is distributed and sent out for delivery, whereas with the continuous service of the tubes the mail is distributed as it arrives and no such delay occurs, thus avoiding the serious congestion which frequently occurs with the present service. In this case, as before, the average gain is one-half the time required to sort a wagonload of mail, though it is not possible to state the amount of this saving as definitely in minutes as at the dispatching office. It will be seen that this gain due to the continuous service of the tubes has no connections with the increased speed of the carriers in the tubes or with the distance between the stations connected by the tubes, but that it depends wholly upon the continuous service of the tubes.

In the case of mail for out-of-town points the gain due to the continuous service must be considered in connection with the intervals between mail trains. If mails between two cities are dispatched at intervals of, say, four hours, it is clear that the expediting of the mail due to the tube service may enable a letter to catch a train which it would otherwise miss, and that its actual delivery to the addressee will be expedited by the interval between trains, or four hours. In the case of mail for distant points where the interval becomes, say, one day, the catching of a train which it would otherwise miss will hasten the delivery of a letter by an entire day.

The same principle applies, whatever be the interval between successive mail services, and in the case of trans-Atlantic mails the gain may reach four days; in the case of trans-Pacific and South American mails, fifteen days, and in a few other cases an entire month, and this condition applies to outgoing foreign mails from all portions of the country. It will often happen that the catching of an earlier train will result in the arrival of a letter at its destination post-office at an hour which will permit its delivery the same day, whereas arrival by the next train, while still within business hours, may yet be so late as to prevent delivery until the next day.

It will thus be understood that the gain due to the tubes in New York will in some cases hasten the delivery to an addressee in Buffalo, Pittsburg, and Chicago by twelve hours and in San Francisco by twenty-four hours.

It is clear that whereas all local letters are thus hastened in delivery by the tubes, only a portion of the through mail is thus hastened. As an indication of the amount of through mail thus hastened, the postmaster at New York states that 20,000 outgoing out-of-town letters per day are thus advanced by one dispatch. The corresponding number given by the postmaster at Brooklyn is 10,000, by the postmaster at Philadelphia 30,000, and by the postmaster at Boston 10,000 per day.

Similar gains are made in the distribution of mail arriving from out of town. The Chicago local committee caused a count to be made for September 26, 1900, of the number of pieces of arriving first-class mail which would be advanced were the tubes in service between the railroad depots and the general post-office, the result being 63,600 pieces per day which would be advanced one delivery. The same committee found by count that tube service between the general post-office and the branch offices would advance 100,000 letters per day one delivery, or by approximately one and one-half hours.

It being clear that the effect of the tube service is to quicken the delivery of all local mails by a certain amount of time and to quicken the delivery of a portion only of the out-of-town mails by much larger amount of time, and in order that the cost of the tube service may be compared with its value in connection with both through and local mails, we have given further on a comparison of its cost with the postal receipts from various cities, both for all classes of through and for first-class local mail matter.

Other advantages of the tube service are less easily estimated in value, although no less real. Chief of these is the certainty of the service and its safety from interruption. The postmaster at Boston testifies that during and after a violent snowstorm, when street traffic was virtually suspended, the delivery of mail though the tubes proceeded without interruption.

Somewhat similarly the copies of the New York Herald of a certain date intended to be expressed west and south could not be gotten to the Pennsylvania Railroad depot by wagon in time for their train because of a snowstorm. They were, however, gotten to the Madison Square branch post-office and sent thence to the general post-office through the tubes, thence to the depot by wagon, and were put on the usual train, thus saving an entire day in final delivery.

It is clear also that the tube service possesses the same safety from interruption due to the presence of parades and other street demonstrations, as well as during fires, riots, and other possible public disturbances, and from depredations.

It seems reasonable to your committee to expect that the quickened service due to the tubes will lead to an increased use of the mails for local special-delivery service. It is well known that in the larger cities a large business is done by the telegraph and messenger companies in handling local correspondence, although their charges for this service are materially higher than for special-delivery mail matter. The experience in New York has shown in the districts now covered by the tubes, and within a reasonable radius from their terminals, that special-delivery letters arrive at their destinations much quicker than is possible with the district messengers and considerably quicker than is possible with the telegraph. Ordinarily increased facilities of any kind must create new business before a profit can be returned upon them; but in this case a large mass of business is already in existence,

which it seems reasonable to expect will be diverted to the postal department as soon as a quickened service gives the necessary dispatch and the public becomes acquainted with the bettered service.

While thus recognizing, as your committee freely does, the great benefits which would follow the extension of the system, we also recognize that it is expensive, and it remains to contrast the cost with the benefit to be obtained in the various cities in order (1) to determine whether the benefit will justify the cost in any case, and (2) to find, if possible, some rule or principle by which to determine what cities, if any, shall have it, and to how great an extent they shall have it. In order to thus reduce the matter as far as possible to a simple matter of arithmetic, we have made below a tabular comparison between the cost of the service per annum in the various cities and the annual volume of postal revenue for the same cities.

The list of cities for which these figures of cost were first obtained by the joint committees originally comprised eleven. From these the joint committees eliminated three, because the cost was found to be disproportionate to the service to be rendered. From the remaining eight this committee has eliminated two more for the same reason. For a third city, while indorsing the existing tube, we have recommended no extension, and for two additional cities we have largely cut down the programmes outlined by the joint committees. There thus remain but three cities out of the original eleven in which this committee considers that the benefits to be obtained would justify the outlay necessary to install the tubes in accordance with the programmes of the joint committees.

When it is understood that the cities of the original list were selected by the Post-Office Department because, presumably, the tubes would be justified in them, we are confronted with the fact that on the present basis of cost no general extension of the system throughout the cities of the country is to be seriously contemplated, and that until its cost can be very materially reduced it must remain a system of brilliant promise but comparatively limited application.

The following table gives figures and deductions regarding eight of the cities which have been reported upon by the joint committees after the elimination of three from the original eleven. These figures give the postal revenues of these cities (*a*) from all classes of matter, and (*b*) from local first-class mail. They also give the estimated net cost of the tube service for each city and the ratios between these quantities; that is, they show the percentage of the total postal revenue for these cities and the percentage of revenue on the first-class local mail which would be required to meet the expenses of the proposed tube service.

The various joint committees have seen fit to revise the figures for cost and operating expenses submitted by the bidding companies. These revisions have resulted from the suggested saving in cost of plants, due to placing the power stations in Government buildings and from the suggested saving due to the employment of a smaller force in operating the tubes, which smaller force the joint committees considered sufficient for the purpose. In making up the following table, this committee has not felt at liberty to make use of these revised figures of the joint committees. This action on our part is not, however, to be understood as in any way discrediting the judgment or conclusions of the joint committees. On the contrary, we have every respect for the ability, expert knowledge, and care displayed through-

out the work of those committees. We simply feel in a matter of this kind that the Government should be the judge as to whether the proposed arrangement of the power plants in the public buildings is permissible, and that the Post-Office Department should judge whether or not the proposed reduction in the amount of attendance allowed is safe and proper.

It is understood, therefore, that the figures for the cost of the tube service are those given in the proposals of the bidding companies, from which figures, however, have been subtracted the obvious savings due to the discontinuance of the present services and the fact that a portion of the labor for operating the tubes would be taken from the present clerical force. The figures for the postal revenues are for the fiscal year ending June 30, 1899.

In addition to the above, and in order to make possible further comparisons of the cost of the service with its usefulness in the respective cities, we have entered at the right a column giving the percentage of the first-class mail originating in the various cities at the postal stations connected by the proposed lines of tubes, thus showing the extent to which the proposed tube service provides for the entire first-class mail originating in the respective cities. The data appearing in this table are taken from the reports of the various joint committees, and may be corroborated by reference to those reports.

It should be observed, however, that the ratios of cost to revenue, given in the tables, do not agree with those worked out by the joint committees. This apparent discrepancy arises chiefly from the fact that while the joint committees have used their reduced estimates of annual cost as bases of comparison, this committee has used the estimates of the bidding companies as bases.

It is easy to determine from this table certain cities in which tubes are not economically admissible, but it is not so easy to determine in what cities tubes are admissible, because it is impossible to say how much, in dollars and cents, the expediting of a thousand letters per day is worth. It so happens that a sharp line of demarcation runs through the table, on one side of which the ratios of cost to revenue are much lower than on the other. Whether the service is worth its cost in those cases where the ratio is low, is purely a matter of judgment; and in making its decisions this committee simply records its opinion that in these cases it is worth the cost. We furthermore desire to say that this ratio is so low in those cases that we consider that there is no one city and no one tube which can be omitted from our list in preference to the others. We consider them all necessary.

TABLE III.—*Ratios of cost to revenue and extent of service.*

BOSTON.

Annual receipts.	Net annual cost equals rental of proposing company less estimated savings.	Ratio of—	Extent of service.	Percentage of first-class mail originating at postal stations connected by tubes.
Gross revenue	\$2,970,333			
First-class local mail:				
Gross revenue.....	234,605	.31	Connects 1 railroad depot and 1 branch office and 2 proposed branch offices with the general post-office and continues present service.	80
Net revenue.....	126,686	.60		

TABLE III.—*Ratios of cost to revenue and extent of service—Continued.*

NEW YORK.

Annual receipts.	Net annual cost equals rental of proposing company less estimated savings.	Ratio of—	Extent of service.	Percentage of first-class mail originating at postal stations connected by tubes.
Gross revenue..... \$8,811,547	\$240,048	0.028	Connects 1 depot and 15 branch offices with the general post-office and continues present service.	90
First-class local mail:				
Gross revenue..... 1,906,255	.....	.125		
Net revenue..... 1,284,861	.....	.187		

BROOKLYN. (a)

Gross revenue..... \$1,325,000	\$152,597	0.115	Connects 7 branch offices with the general post-office and continues present service.	90
First-class local mail:				
Gross revenue..... 337,377	.....	.452		
Net revenue..... 104,759	.....	1.45		

BROOKLYN. (b)

Gross revenue..... \$1,325,000	\$118,613	0.09	Connects 5 branch offices with the general post-office and continues present service.	85
First-class local mail:				
Gross revenue..... 337,377	.....	.35		
Net revenue..... 104,759	.....	1.13		

BROOKLYN. (c)

Gross revenue..... \$1,325,000	\$87,500	0.066	Connects 3 branch offices with the general post-office and continues present service.	65
First-class local mail:				
Gross revenue..... 337,377	.....	.26		
Net revenue..... 104,759	.....	.83		

PHILADELPHIA.

Gross revenue..... \$3,396,000	\$107,255	0.031	Connects 7 branch offices with the general post-office and continues present service.	87
First-class local mail:				
Gross revenue..... 856,538	.....	.125		
Net revenue..... 446,000	.....	.24		

CINCINNATI.

Gross revenue..... \$1,239,986	\$101,561	0.082	Connects 3 depots and 3 branch offices with the general post-office.	90
First-class local mail:				
Gross revenue..... 361,200	.....	.29		
Net revenue..... 220,387	.....	.46		

CHICAGO.

Gross revenue..... \$6,131,123	\$107,650	0.017	Connects 9 branch offices and 3 railroad depots with the general post-office.	67
First-class local mail:				
Gross revenue..... 718,380	.....	.15		
Net revenue..... 431,028	.....	.254		

ST. LOUIS.

Gross revenue..... \$1,826,742	\$134,289	0.074	Connects 2 railroad depots and 11 branch offices with the general post-office.	90
First-class local mail:				
Gross revenue..... 336,594	.....	.40		
Net revenue..... 218,786	.....	.61		

SAN FRANCISCO.

Gross revenue..... \$998,929	\$49,924	0.05	Connects 2 railroad depots and 3 branch offices with general post-office.	80
First-class local mail:				
Gross revenue..... 81,319	.....	.614		
Net revenue..... 44,725	.....	1.11		

SEC. VII.—*Justifiable extent of introduction of pneumatic service.*

In the following analysis of the table in the preceding section we have, for the sake of brevity, used as distinguishing terms the words "through" and "local," as applied to different classes of tubes. These terms are to be understood as follows:

Tubes connecting the railroad depots with the general post-office are called through tubes.

Tubes connecting general post-office with branch post-offices are called local tubes.

Analysis of this table shows, first, that the three cities of New York, Chicago, and Philadelphia form a class by themselves in that the cost of tube service in them is 3.1 per cent or less of the gross postal revenue, 15 per cent or less of the gross revenue from local first-class mail, and 25.4 per cent or less of the net revenue from local first-class mail, as shown more concisely, thus:

City.	Percentage of gross revenue required to pay for tube service.	Percentage of revenue from first-class mail required to pay for tube service.	
		Gross.	Net.
New York	2.8	12.5	18.7
Chicago	1.7	15.0	25.4
Philadelphia	3.1	12.5	24.0

Analysis of the table shows, secondly, that Boston stands in a class by itself in that the cost of tube service is low when compared with the gross revenue, but high when compared with the revenue from local first-class matter, thus:

City.	Percentage of gross revenue required to pay for tube service.	Percentage of revenue from local first-class mail required to pay for tube service.	
		Gross.	Net.
Boston.....	2.5	31.0	60.0

Analysis of the table shows, thirdly, that Brooklyn, Cincinnati, St. Louis, and San Francisco form a class by themselves in that the cost of tube service as outlined by the joint committees is high when compared with either the gross revenue or the revenue from local first-class mail, thus:

City.	Percentage of gross revenue required to pay for tube service.	Percentage of revenue from local first-class mail required to pay for tube service.	
		Gross.	Net.
Brooklyn:			
7 branch offices connected	11.5	45.2	145.0
5 branch offices connected	9.0	35.0	113.0
3 branch offices connected	6.6	26.0	83.0
Cincinnati.....	8.2	29.0	46.0
St. Louis	7.4	40.0	61.0
San Francisco	5.0	61.0	111.0

NEW YORK, CHICAGO, AND PHILADELPHIA.

While modifying nothing of what is said in this report regarding the expensiveness of the service, nor of what is said in objection to the percentage plan of rental, which objection we here confirm, and while believing that the Department should be able to obtain lower figures, this committee believes that these tables show that such expense, if unavoidable, would be justified in the cases of New York, Chicago, and Philadelphia. The committee recommends that the existing tube service be maintained in New York and Philadelphia and that additional tubes be installed in all three cities in accordance with the recommendations made by the joint committees, except that no tubes shall be less than 8 inches in diameter, and at a cost to be adjudged reasonable by the Post-Office Department.

BOSTON.

In Boston the committee believes that the tube line proposed between the general post-office and the South Terminal station should be laid down, but on the evidence submitted it does not consider that the tube line proposed to connect the general post-office with the Back Bay station would be justified. If it be objected that the percentage of the gross revenue shown is too high for the limited service it should be remembered that the percentage given above is based on the installation of both through and local tubes. If the local tube line should be omitted, the figures for Boston would stand as follows:

City.	Percentage of gross revenues required to pay for the tube service.
Boston.....	1.5

The committee therefore recommends that the existing tube service be continued and that a tube line be installed in Boston between the general post-office and the South Terminal station, but none between the general post-office and the Back Bay station. The limitations as to size and cost made in the cases of New York, Philadelphia, and Chicago are understood to apply here also.

ST. LOUIS.

In St. Louis special conditions exist. We do not consider that the programme proposed would be justified in that city, but the locations of the depots and general post-office there are such as to give unusual value to a pair of through tubes, one connecting the relay depot and the post-office at East St. Louis with the general post-office, via the Eads Bridge, and the other connecting the St. Louis Union Depot with the St. Louis general post-office. If the local tubes be stricken from the programme, as in the case of Boston, the figures would become as follows:

City.	Percentage of gross revenue required to pay for tube service.
St. Louis	2.8

This committee therefore recommends that tube lines be installed to connect East St. Louis Relay Depot and the nearby post-office with the St. Louis general post-office, and to connect the St. Louis Union Depot with the St. Louis general post-office, but none to connect the St. Louis general post-office and branch post-offices. The limitation as to size and cost made in the cases of New York, Philadelphia, and Chicago are understood to apply here also.

BROOKLYN.

In Brooklyn the present tube line connecting the general post-office with the New York office is of unique value, in that it carries practically all the Brooklyn through mail, both outgoing and incoming. It therefore performs a larger service to a larger population than any tube line existing or proposed, and we consider that its use should be continued. As regards tubes between the general and the branch post-offices, the ratios of cost to revenue seems so disproportionately high that we can not approve of their installation. We recognize, however, that special conditions exist in Brooklyn whereby the test of ratio of cost to revenue does not show so accurately as in other cities the relative importance of the service. We therefore recommend that in the case of Brooklyn the existing tube service be continued, but, notwithstanding the special conditions referred to, we are compelled to recommend that at present no additional tubes be laid down.

SAN FRANCISCO.

In San Francisco, while the programme proposed apparently offers the same opportunity for revision as in the case of Boston and St. Louis, the facts are otherwise. The locations of the branch post-offices are there such that they lie on the lines of the tubes proposed between the depots and the general post-offices, and hence the omission of the branch post-offices from the programme will make no material reduction in the cost of the service. As the percentage is already high and as the reductions to through service will make no material reduction in the percentage, the committee considers and recommends that no tubes should be laid down in San Francisco at present.

CINCINNATI.

In Cincinnati the percentages as they stand are too high to justify the installation of the tube service, and no sufficient reduction can be made there at present to justify their installation. The committee therefore considers and recommends that no tubes should be laid down in Cincinnati at present.

SEC. VIII.—*General observations, recommendations, and deductions.*

Should the programme we recommend be carried out, the committee would recommend that the installation of local tube service in New York, Chicago, and Philadelphia would give an excellent opportunity to test the effect of the quickened service in increasing the use of the mails for local-delivery letters, and it advises that exact account be kept of the percentage of local to through mails in those cities. Should the anticipated increase take place, valuable data will be obtained therefrom by which to judge of the extent to which local tube lines may be properly installed in other cities in anticipation of similar increases in them. The committee considers that in both Boston and St. Louis the conditions are such as to give good reasons for anticipating a large increase of local mail; but it considers also that in the absence of actual knowledge of the effect of the tubes in increasing the quantity of such mail matter it would be unwise to install local tubes simply in anticipation of such increase. The essential point is that in New York, Chicago, and Philadelphia the existing local business is sufficient to justify local tube service, and by taking advantage of the fact and then noting the effect of the tubes in stimulating such local business in those cities valuable data may be accumulated from which to judge of the advisability of installing tube service in other cities in anticipation of similar increases in local postal business in them.

In view of the fact that the researches of your committee, coupled with the engineering experience of its technical members, have shown that the various companies tendering for pneumatic service have in most cases, apparently, at least, estimated too large a cost for construction, and hence too high a figure for annual rental where the same is based on cost of construction. We therefore recommend that before steps are taken to let any contracts for pneumatic transmission of mails new proposals be advertised for, and that it be distinctly understood that bids in order to be deemed acceptable must be based on moderate charges for operation and equally reasonable cost of construction.

In connection with data connected with this matter the committee caused investigation to be made of charges for operating expenses in New York and Boston, where the compressor plants are located in United States public buildings and the power formerly furnished by the Treasury Department, thus permitting independent determination of costs as apart from total charges for rental. The items of operating expenses which were considered cover cost of power, attendance, oil, waste, and supplies, and also repairs to compressor mechanism.

The estimate submitted by the local companies in New York and Boston for the above items appear, generally, just and reasonable.

The committee recommends that all bids thus far received for the construction, extension, or operation of any or all pneumatic tube lines be rejected, the proposing parties notified, and new proposals asked for, and all parties desiring to bid be required to furnish the following information and plans in order that the Government engineers may be able to thoroughly understand what is proposed and report thereon intelligently:

1. Map of route.

2. Profile showing approximate depth of tube line, contour of surface, existing pipe lines and conduits, together with any special underground difficulties, when possible to obtain this formation.

3. Power plant, boilers, dynamos, and all operating machinery in connection therewith.

4. Character of pipe to be used and method of laying.

5. Building to be occupied for substations or power plants.

6. If a bulk or flat proposal be made it must be accompanied by the general plans and plans in detail of all special work where it is possible to make the same, all of which must be properly certified by the proposing party and duly witnessed.

7. Where a unit proposal is made the same conditions shall apply.

The committee does not undertake to weigh the question of policy involved in Government ownership of public utilities, but presents herein such facts as have a bearing on the special subject of inquiry in hand.

The practice of the Post-Office Department seems to have been to own and operate such devices and equipments as are used exclusively in this service, and to employ, under contract, those agencies in which its service is incidental or subsidiary to the other and general business of such agencies, as railway and steamship lines.

It is virtually conceded that the tube lines and installation for postal service can not be used for general commercial purposes. The committee believes that in any situation justifying a tube line, the requirements of the postal service will be too exacting to permit its use otherwise. Stations must be adapted to purposes somewhat diverse, as overcrowding, confusion, and needless delay are likely to result at critical times. It is also probable that the growing use of the tubes for other than first-class mail will ultimately tax their entire capacity.

Some economy may result from the use of a power plant installed for a larger service than required for a postal plant; but as the cost of the power plant in the estimates submitted is less than one-sixth of the total, this saving will not be so considerable. In many cases it will be feasible to utilize or extend Government plants now in existence and thus materially reduce this item of installation and the cost of operating the power plant.

It appears, therefore, that the tube line and equipment are practically divorced from uses other than the postal service, and that the power plant may be separate installation where required without material increase in cost, so that the entire system may be treated as an independent entity.

The question of rental may be discussed on the basis of a proper return on the total investment.

From such consideration as the time and circumstances permitted, the committee has been unable to determine a higher physical value than \$30,000 per mile for an 8-inch tube line complete with its due proportion of incidental charges under normal city conditions. A comparison of two estimates for service in Chicago and St. Louis, recommended by the joint committee, assigned the ratio of about one-half the cost of the line for the physical value of the equipment for stations and line, and the ratio of one-third of the physical value for the power plant. The real estate and right of way are properly a separate item, and the ratio is taken at one-sixth, which is much above the amount given in any estimate. The following estimate for a system of 10 miles will illustrate the use of these ratios:

PNEUMATIC TUBE SYSTEM.

AVERAGE CITY CONDITIONS—10 MILES.

Double tube line, \$30,000 per mile.....	\$300,000
Equipment, one-half of above ¹	150,000
Power plant, one-third of above ¹	100,000
Real estate and right of way, one-sixth of above.....	50,000
Total physical value.....	600,000

Rental should consider the following:

Interest at 4 per cent of the actual physical value of the property.

Taxes which may be taken at 1 per cent on the physical value.

Annuity of 3.23 per cent, computed on a basis of 4 per cent, and a life of 20 years, the sum that must be invested yearly to renew the plant.

Net earnings, 3 per cent. This is the incentive to efficiency in corporate management and varies greatly under business conditions. This return should be moderate under fixed conditions of revenue as in the proposed service. Any rentals or income taxes as distinguished from taxes on real property are charged against this item. Royalties and cost of franchises are usually represented in the stock; otherwise interest on the cost of these at 4 per cent would be charged against this item. The application of net earnings is of no interest further than to determine that the item itself shall not be excessive.

The following table is based on the presumption of a continuing contract with the Government:

PROPER CHARGE FOR RENTAL.

Interest and taxes, 5 per cent of physical value.....	\$30,000
Annuity, 3.23 per cent of \$550,000.....	17,761
Net earnings, 3 per cent of physical value ²	18,000
Total, 10.96 per cent of physical value.....	65,761

If the Government is to own the property, the item of interest can be reduced to 3 per cent and the item of taxes and net earnings omitted, but the annuity must be increased on account of lower interest rate.

VALUE OF PROPERTY.

Physical value.....	\$600,000
Royalty, 10 per cent of construction.....	55,000
Total cost.....	655,000

ANNUAL CHARGE.

Interest, 3 per cent on \$655,000.....	\$19,650
Annuity, 3.65 per cent on \$550,000.....	20,075
Total annual charge.....	39,725

The difference between the above annual charge and the reasonable rental to be paid a corporation is \$26,036.

¹ It is to be noted that the items of equipment and power plant may not be subject to the same reduction in estimate as the tube lines; 36 per cent added to these items would nearly restore their original value. Part of this is offset by the liberal allowance for right of way.

² If the interest on royalty, franchise, etc., be taken at \$6,000, there remains \$12,000 net, or 2 per cent of the physical value, for other distribution.

The joint committee reports call attention to certain economies to be effected in operating expenses by dispensing with such company service as can be performed by Government employees, in connection with other duties, and this should be considered in this connection.

In view of the importance of the pneumatic-tube service to business men and of its popular character, city governments should be expected to give all needful cooperation should the General Government elect to undertake the construction and ownership of lines needed for its exclusive use. As to whether the General Government should own and operate these lines involves many questions of public policy about which this committee does not feel called upon to express an opinion, further than to say:

The facilities to be provided are special and exclusive.

Operation and maintenance through the agency of the Government appears to be entirely feasible.

The annual cost would be very materially reduced.

An important and necessary public service would not be subject to the possibility of unreasonable exactions.

On the other hand, it must be pointed out that pneumatic-tube service, while it has passed beyond the mere experimental stage, is still subject to material development. This fact, however, further suggests the limited application of such service in any event until such time as experience shall show clearly all the conditions to be met and all the requirements for a standard system. Among such requirements are:

Maximum utility seems now to demand not less than an 8-inch tube system, all the requirements of the service, facility in operation, and the cost being considered.

Such a system should be uniform in capacity, so as to permit free interchange of carriers in the local service and in the transfer service of through railway mail. It is believed that with the development of the service a special pouch, which can be slipped into the carrier, will be used, thus avoiding repacking in local and transfer mail.

The committee is radically opposed to the proposed system of rental on the basis of a fixed percentage of the cost, whatever that cost may prove to be. Such a system gives no guaranty of the annual cost and opens wide the door for abuses. A conspicuous recent example exists in New York, in which a large and wealthy corporation was wrecked by the application of this method to the reconstruction of its plant. Engineers of experience agree that, while apparently feasible, the verification and limitation of costs of construction by engineering inspection are in fact impossible. If private ownership be decided upon, the committee recommends that the contracts be based upon definite sums per annum.

The committee finds that in the buildings assigned to the whole or partial use of the Post-Office Department, as so often in other branches of the Government, the space which is needed for the legitimate work of the Department properly quartered in them is sometimes monopolized by other departments less well entitled to such accommodations, although frequently, no doubt, no less in need of space. In the present matter an embarrassment arises from the fact that space much needed, perhaps in some cases absolutely essential, for the efficient working of the Post-Office Department, primarily intended for its use in buildings, is occupied by other public departments having less claim. In all such instances it is obvious that the demands of the really legiti-

mate occupant should have precedence, and its claims, once presented, should be instantly allowed and the space required for its work cleared. In the present case there is opportunity to secure very considerable economy in the operation of this pneumatic-tube postal service by making use, especially for power purposes, of space now occupied by other departments. This space should in such instances be vacated, and should be made use of by the Post-Office Department for the purposes for which it is needed.

SEC. IX.—*General principles to be observed.*

The principle which should guide and control in the determination of such questions as "What cities should be provided with this or other system of accelerated dispatch?" or "What extent of employment is justifiable in any one city?" or "What rule shall be adopted as a general guide and check?" must, in the opinion of this committee, be one which shall make the study of the whole postal business affected the basis of conclusions. Whether the loss of five minutes at the locality at which the mail originates shall cause the loss of a day or a week or, as with some foreign mails, of a month, affects not only the writer of the letter delayed but his correspondent in the distant city to which it is sent, and the aggregate of all gains and losses of this character determines the prosperity or the reverse of commerce and industries throughout the country and even throughout the world.

Where a doubt arises after careful study of any one stated problem of this sort in the postal service, it may probably be safely asserted that the benefit of that doubt should be given to the further improvement of the service. Where, however, such large and relatively costly improvements as are here considered are in question, it is evident that the utmost extent of adoption must still be very limited, and only a very few even of the principal commercial cities can be supplied with the system. With further progress in the evolution of this general idea, and with further gain in facilities and economies in construction, it may be anticipated that before many years much larger employment of it may be made than at present. Patents, constructive monopolies, and all the many peculiarly costly conditions of introduction will soon cease to be a serious obstruction.

In the case in hand your committee has endeavored to be at once reasonably mindful of the costs of the improvements advised and yet no less reasonable in considering the extent to which obvious advantage in accelerating transmission may be fairly taken into account in advising the further introduction of one of the most interesting and useful advances in postal transmission yet brought out by our inventors and mechanics.

As a matter of principle, the committee would assume it to be indubitable that the Government should, whenever practicable, own its apparatus, of whatever kind, and especially whenever the service would be otherwise liable to interruption or impairment. On this principle it would seem unquestionably important that so vital a matter as the private ownership of all systems of postal transmission and, even more undeniably, systems of special and essential character, such as those here studied, should be brought into accordance with this view at the earliest possible moment. While it may often be advisable that, in the experimental stages, such promising improvement may, and often must, be left in the hands of inventors and promoters,

it should be held to be an admitted and indisputable principle that, at the earliest possible stage in its development, once its permanent introduction seems assured by its successful operation, the Government should construct the apparatus from its own specifications and by fair competitive bidding, under the advice and supervision of its own experts, and in entire independence of the commercial interests involved.

Meantime extensions by contract should be proceeded with cautiously and no more rapidly than absolutely necessary in the maintenance and improvement of the efficiency of the service in important localities. Cautious procedure in the experimental period, and then immediate adoption of governmental ownership, and of construction and maintenance by the Department, quite independently of any private and commercial interest, should be the governing method. We would advise the application of this principle as rapidly and extensively as practicable.

As a matter of principle, it is submitted that the Government should endeavor to develop such novel and improved systems of postal work as the inventors of the country may bring before responsible officials, and especially to promote, where practicable, such alternative and promising systems as may seem likely to provide ultimately a wholesome and stimulating competition, thus insuring, as far as practicable, the engaging in the work of development and evolution of as many bright minds and wise promoters of improvements as possible.

It is no less important as a guiding principle that the most safe and certain system, as judged from the point of view of the responsible officials of the Government, should be given the most vitally important work, while the experimental and less well tried or less promising of the systems found acceptable should be developed in subsidiary and less critical work, as in minor, auxiliary, or subsidiary constructions. Precisely how this principle can be best put into effect can only be judged by the responsible officer of the Government and its expert advisers in each instance.

With reference to the renewal of contracts, the principles to be observed would seem to be:

(1) On existing contracts, where immediate purchase is either inadvisable or impracticable, renew the leases on a basis certified by the Department's experts to be fair and even liberal, but not unreasonable, inserting in every case an option of later acquirement, probably with appraisal by experts, of all property and all patent rights applicable to the contract, otherwise by a stated figure.

(2) On new contracts provide for a lease for a stated term to insure full and satisfactory trial, with option of purchase on stated terms certified to be reasonable by expert authority and including all necessary patent rights.

(3) Alternate plans or systems to be given fair trial when shown to the satisfaction of the Department to be likely to prove efficient and economical, and leases for moderate periods to be made with option of Government ownership if satisfactory.

SEC. X.—*Résumé.*

(1) This committee finds the pneumatic method of mail transmission a novel, a valuable, and a mechanically successful system, ingeniously elaborated and practically adapted in an admirable manner to the purposes of the Post-Office Department.

(2) The committee finds the system of immense advantage to the business interests of the country in its facilitation of mail transmission, both locally and generally, throughout the United States.

(3) The cost of this advance in postal methods is found to be necessarily large, but yet to be productive of more than proportional advantage in the large cities.

(4) The Government, through its responsible officials, should be the final judge of the extent of ultimate adoption.

(5) The committee advises the retention of all existing plants, and would recommend extensions in a limited number of cases, as specified in the body of this report.

(6) The cost of the pneumatic service is believed to be capable of some reduction, and of very considerable reduction with the further progress of improvement.

(7) It is recommended that contracts hereafter made should be based upon proposals including exact specifications in detail, with all required maps and plans, and capable of precise verification by the expert advisers of the Government.

(8) Ownership by the Government is considered desirable whenever the systems adopted have passed the experimental stage.

(9) A correct system of estimation of a proper rental is advised, and an illustration of such a method is given.

(10) Leasing is admissible under special conditions, described in a general way in the body of this report.

(11) Systems adopted should be as far as practicable standardized, and in operation interchangeability of mail packages therein should be secured.

(12) The system of rental on the basis of a stated percentage of construction costs is condemned.

(13) The Post-Office Department should be given precedence in assignment of space in the United States public buildings where post-offices are located when such space is needed for essential machinery and apparatus and their accessories.

(14) Certain general principles, as specified in this report, should be adopted and adhered to in the decision of questions bearing upon the introduction of such improvements as are here discussed and in extension and further improvements.

This committee feels that it would be unjust to close this report without an acknowledgment of the unique value of the assistance given by the postal expert, Mr. J. M. Masten. Cordial acknowledgments are due to him, and no less to the Department for its admirable selection of an expert assistant for this committee.

This committee desires to call attention to the fact that this is not merely a majority report, but that it is unanimous. No difference of moment regarding any of the conclusions reached exists among the members of the committee.

Respectfully submitted.

THEODORE C. SEARCH, *Chairman.*

ROBERT H. THURSTON.

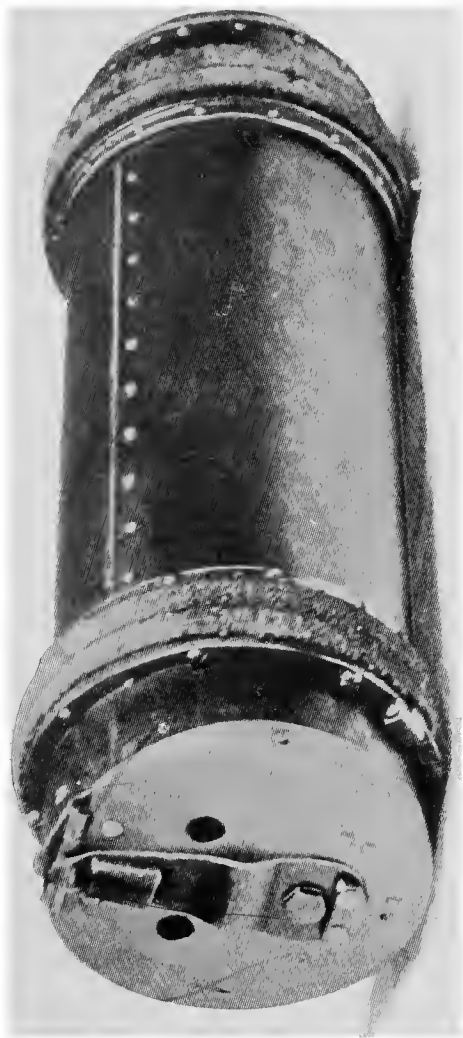
S. C. MEAD.

ALFRED BROOKS FRY.

W. T. MANNING.

FREDERICK A. HALSEY.

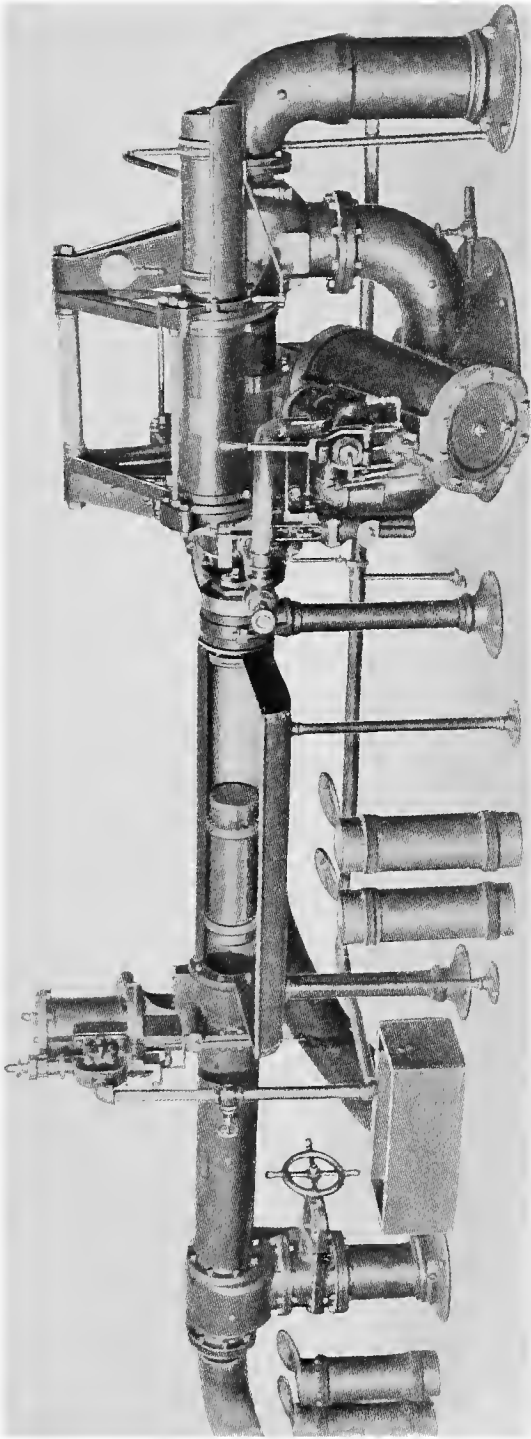
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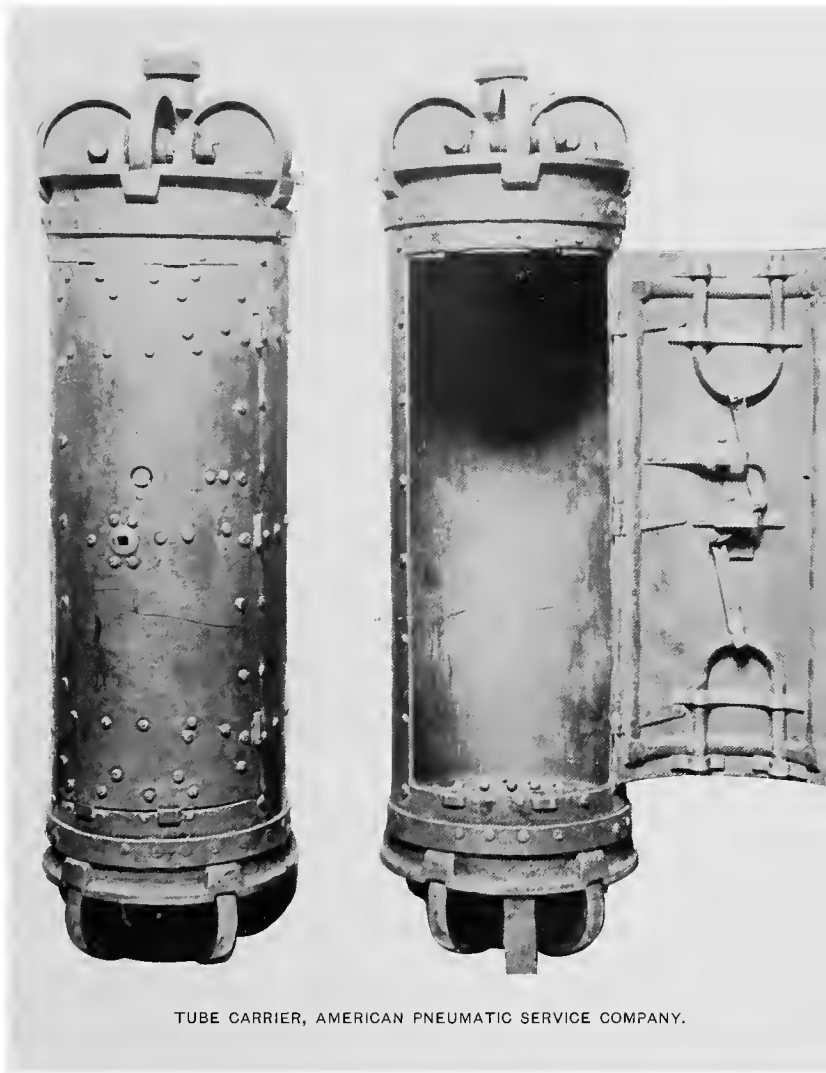
EIGHT-INCH CARRIER, BATCHELLER SYSTEM.



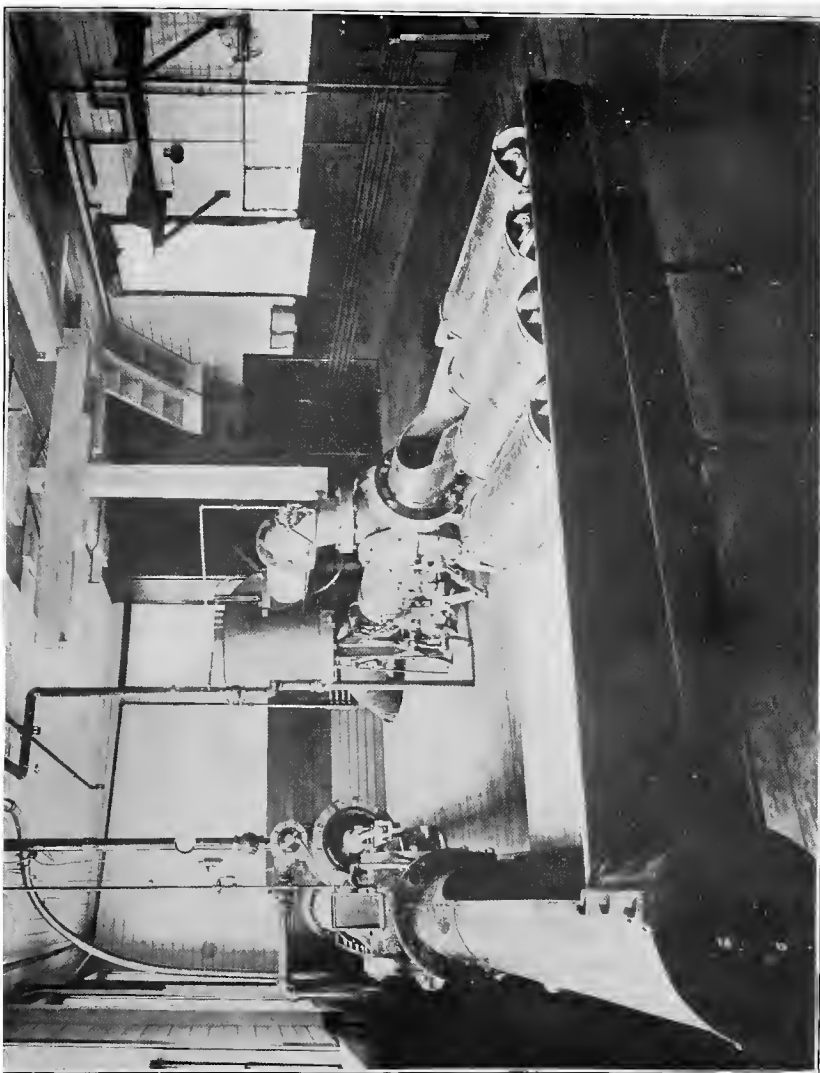
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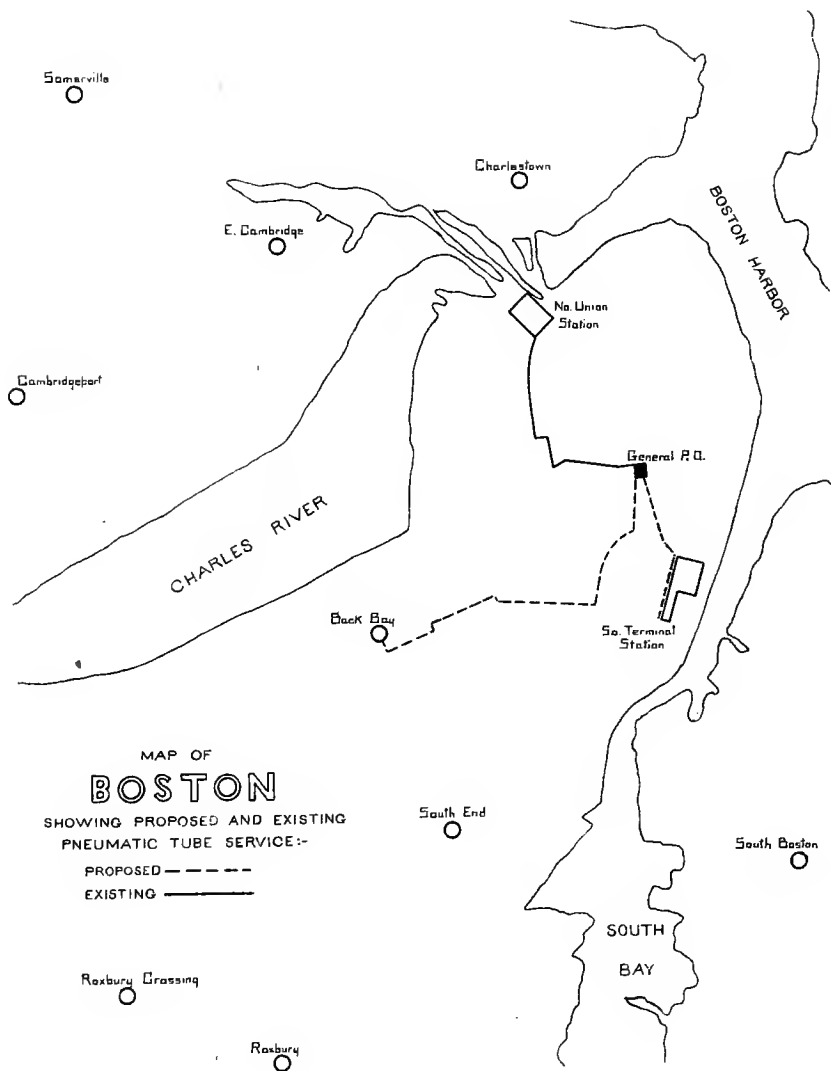


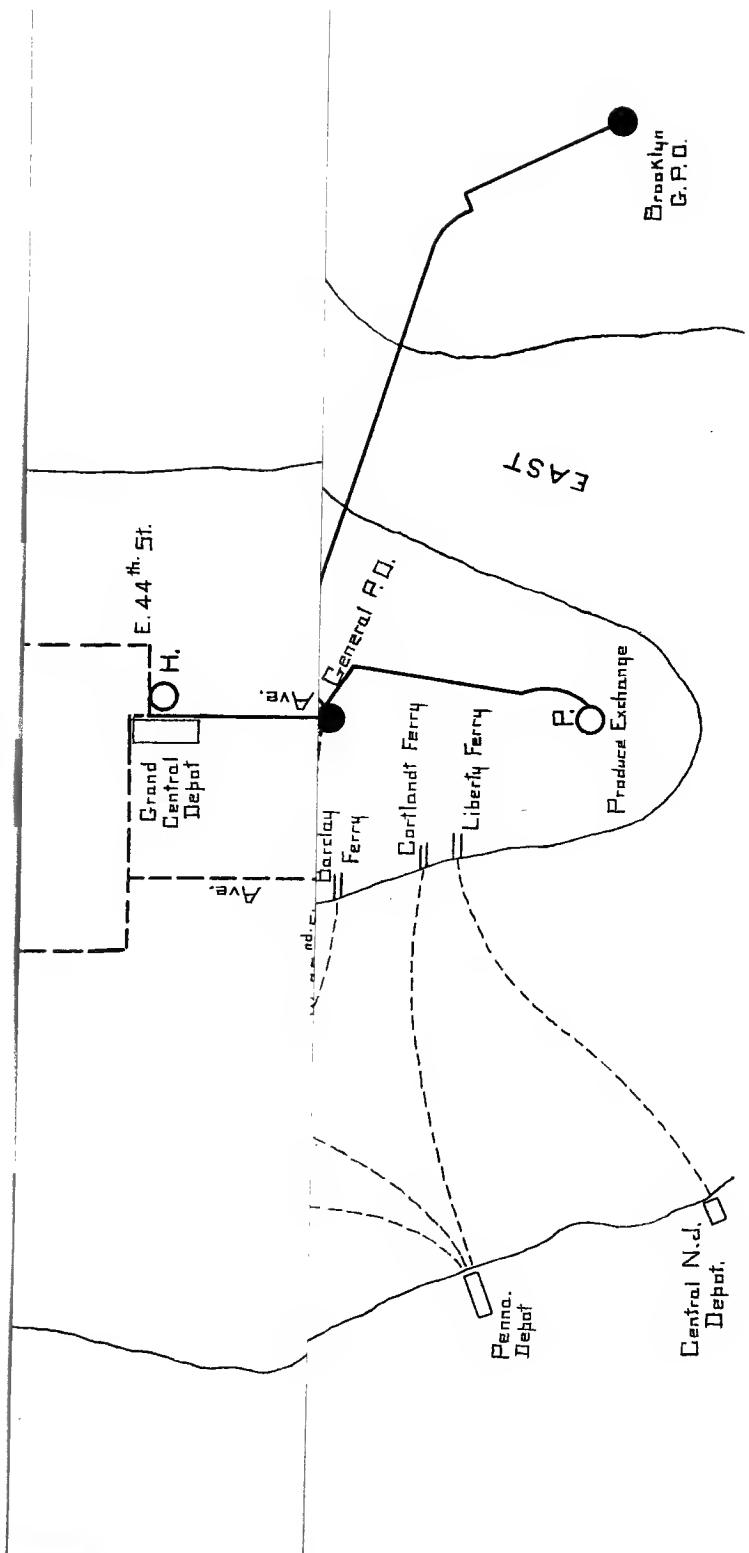
SENDING APPARATUS AND OPEN RECEIVER, BATCHELLER PNEUMATIC TUBE COMPANY.



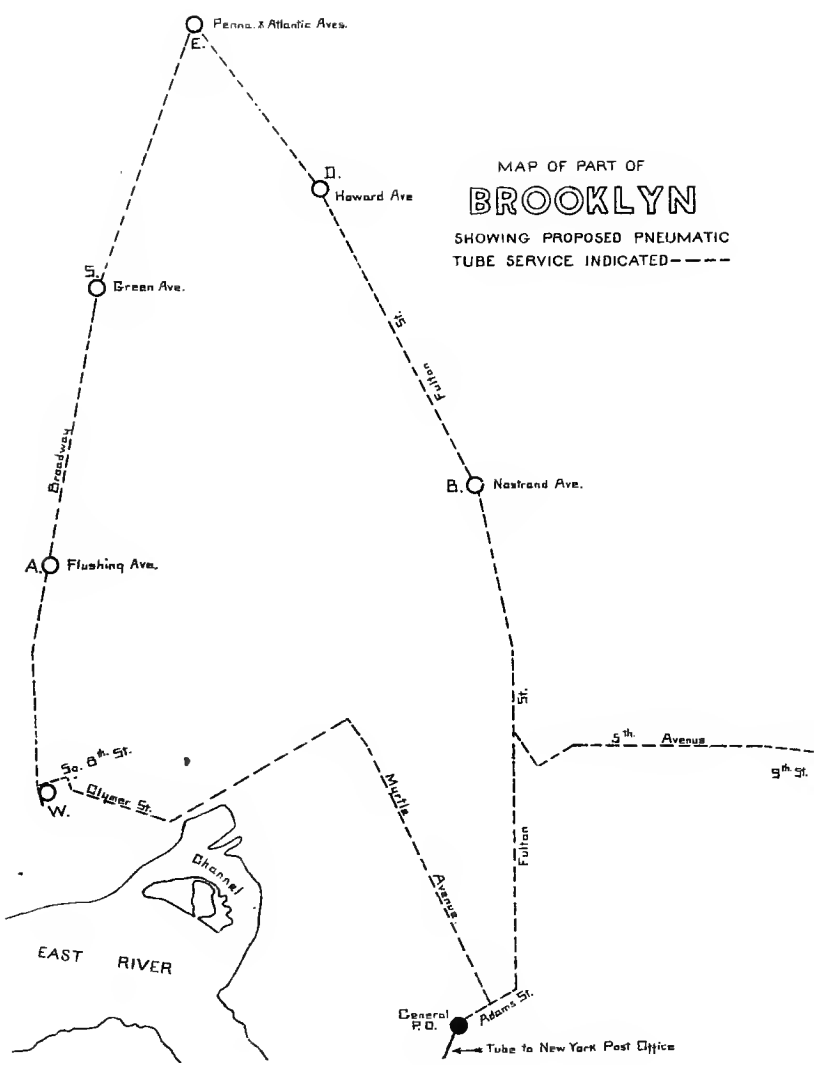
TUBE CARRIER, AMERICAN PNEUMATIC SERVICE COMPANY.







MAP OF PART OF
BROOKLYN
 SHOWING PROPOSED PNEUMATIC
 TUBE SERVICE INDICATED-----



G. Germantown & Chelten Aves.

R. Butler & Broad Sts.

F. Frankfort Ave. & Orthodox Sts.

MAP OF PART OF

PHILADELPHIA

SHOWING PROPOSED AND EXISTING
PNEUMATIC TUBE SERVICE

SERVICE PROPOSED - - - - -

EXISTING - - - - -

PROPOSED BUT NOT RECOMMENDED - - - - -

Q. 5th & Lehigh Sts.

E. Frankfort Ave. & Clearfield Sts.

K. Spruce & Norris Sts.

C. 19th & Columbia Sts.

D. 6th & Columbia Sts.

d. 19th & Fairmount Ave.

S. Fairmount Ave. & Marshall St.

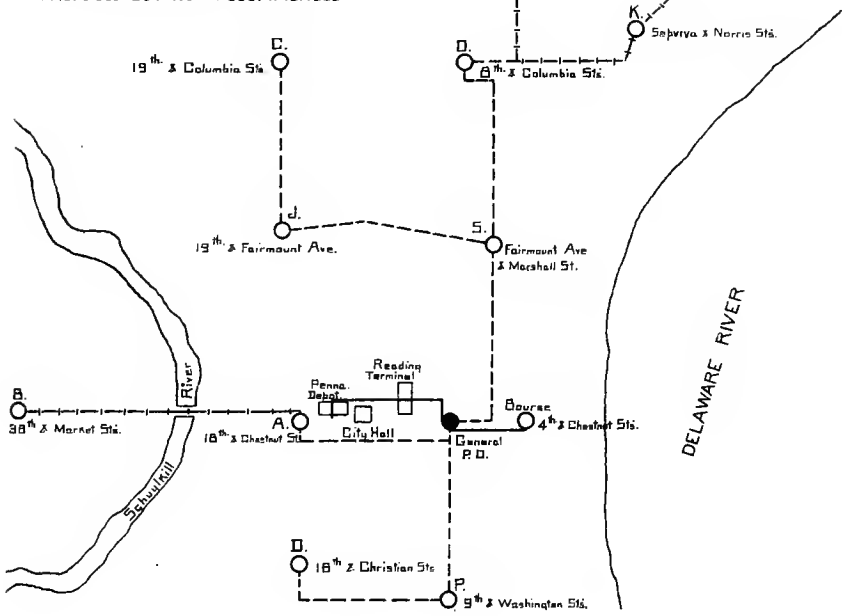
B. 38th & Market Sts.

A. 18th & Chestnut St.

Bourae 4th & Chestnut Sts.

D. 18th & Christian Sts.

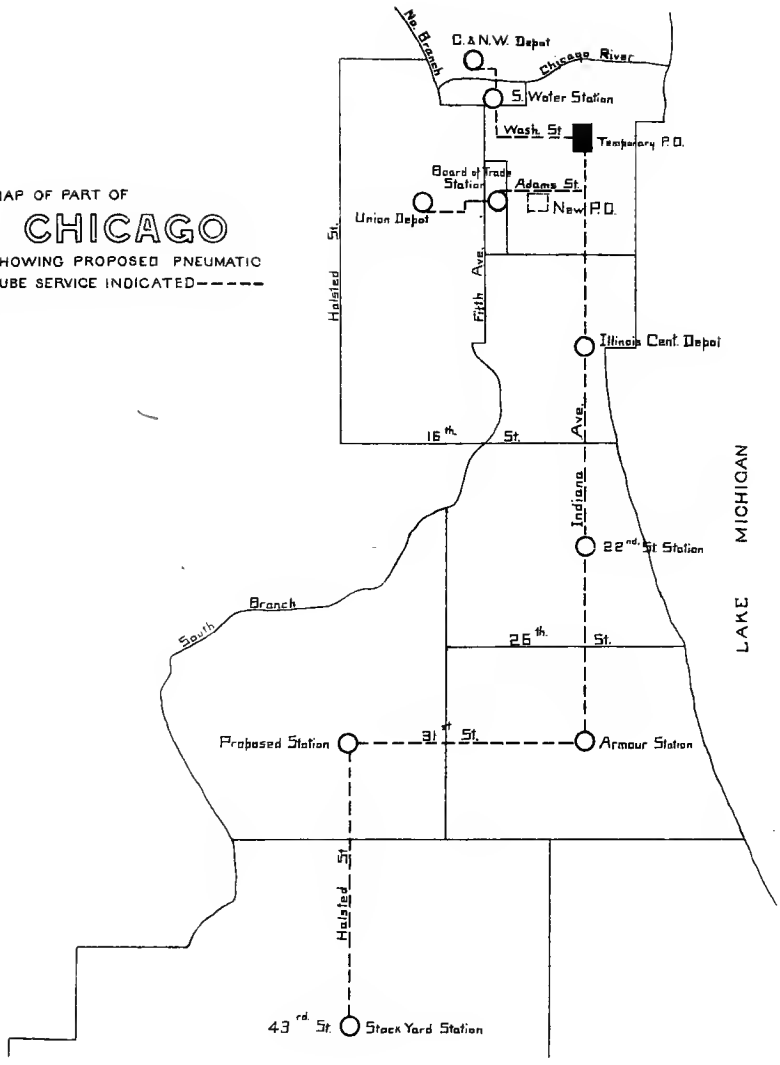
P. 9th & Washington Sts.



MAP OF PART OF

CHICAGO

SHOWING PROPOSED PNEUMATIC
TUBE SERVICE INDICATED-----



MAP OF PART OF
SAN FRANCISCO

SHOWING PROPOSED PNEUMATIC
 TUBE SERVICE INDICATED - - -



BOSTON.

OFFICE OF THE POSTMASTER,
Boston, Mass., October 6, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The joint committee on pneumatic-tube service, proposed for the city of Boston, have the honor to report, in accordance with the instructions contained in Postmaster-General's Order No. 989, that the subject has been taken up in this city. The preliminary work done by the local committee has been reviewed, and such other investigations made as were deemed advisable, and which included an inspection of a new device owned by the American Pneumatic Service Company, of which company Mr. W. E. L. Dillaway, of this city, is the president. The experimental line of this company is located at Lowell, Mass., and comprises a line of 4,000 feet in length, which was laid down in March of this year. This line is 10 inches in diameter, the inside diameter of the carriers being about 9 inches and the length about 24 inches, although another style of carrier is proposed which will be of greater length, say about 30 inches. It is claimed for this system a considerable reduction in the amount of power required and a lessened expense in operation and repairs, as well as cheaper original construction. These claims are advanced by the officers of the company, but as yet we have been unable to satisfactorily verify them.

There is considerable public sentiment in Boston favorable to the extension of the pneumatic-tube service. Such extensions have been discussed from time to time in public meetings and in the public press. Some inquiries into these facts were made by a Congressional committee within the past year. In view of these facts this committee is of the opinion that the Post-Office Department should contract for the extension of the pneumatic-tube mail service, of course within reasonable limits of cost:

(1) Between the general post-office and the South Terminal Station, a distance of 3,750 feet, running from an available point on the main floor of the general post-office to the mail room at the railroad station on Atlantic avenue, of a diameter and operated by a system that would give interchangeable carrier service with the present service, which extends from the general post-office to the Northern Union Station.

(2) Between the general post-office and the Back Bay post-office station, located on Boylston street, a distance of about 8,250 feet. There are two propositions that appeal to us in the latter case, and the selection will eventually have to be made from the cost of obtaining one or the other. The first would be to install a 6-inch inside diameter service, to be exclusively for mail purposes, and to be operated during such hours as required, but practically eighteen of the twenty-four. The other is to rent a certain portion of the capacity of a commercial tube that is now being constructed in Boston by the Boston Pneumatic Transit Company, and which is contemplated to be laid from a point on Harrison avenue, near Essex street, to Back Bay, and eventually extend thence along Washington street, passing Station A, to Dudley street, near the Roxbury station. At present it is deemed necessary that the pneumatic mail service should extend only to the Back Bay

Station. The capacity that would be proposed to rent is stated as approximately ten minutes of each half hour between the hours of 5 a. m. and 7 p. m., on week days only, it being considered that this period of time in each half hour will be sufficient of the capacity of the 10-inch tube being constructed to adequately transport the first-class mail between the general post-office and the Back Bay, and thus add to the facilities between these points a first-class service for the carriage of letter mail, including the special delivery. The Back Bay locality serves approximately 70,000 population, and its mails are of the most important of any of the districts of the city of Boston, and are rapidly increasing in quantity and importance.

The committee has felt it necessary at this point to secure definite propositions from the company named, which practically controls the franchises for the installation of such service, previous to making positive and final recommendations contemplated by your instructions, and have accordingly addressed a communication of this date to the president of that company requesting such estimates in detail as can be furnished. We have the assurance that they will be furnished as promptly as possible, and also that this company is disposed to consider the subject upon a reasonable basis of profit for the installation and operation of the systems outlined.

In order that this committee may be in a position to definitely decide upon this matter, we request that a competent engineering authority be obtained to pass upon the specifications that will be submitted by the Boston Pneumatic Transit Company, and we feel disposed to recommend as such engineering expert Mr. Alfred Brooks Fry, an engineer officer detailed from the Navy Department as the superintendent of repairs of public buildings in New York City, and who in the past has been in charge of extensive repairs of the Boston post-office building by direction of the Treasury Department.

We remain, very respectfully,

GEO. A. HIBBARD,
Postmaster.

EDW. J. RYAN,
Superintendent Railway Mail Service.

J. M. MASTEN,
Chairman.

E. W. ALEXANDER.
J. A. MONTGOMERY.

AMERICAN PNEUMATIC SERVICE COMPANY,
BOSTON, November 17, 1900.

Messrs. J. M. MASTEN, *Chairman of Commission, and*
GEORGE A. HIBBARD, *Postmaster, Boston, Massachusetts.*

GENTLEMEN: I beg to confirm to you the correctness of the figures herewith sent to you by the Boston Pneumatic Transit Company, and to say that the American Pneumatic Service Company would be willing to undertake construction at these prices.

Yours, very respectfully,

AMERICAN PNEUMATIC SERVICE COMPANY.
W. E. L. DILLAWAY, *President.*

NOVEMBER 17, 1900.

Estimate of general operating expenses sliding carrier systems.

General post-office to Northern Union Station (8-inch); general post-office to Southern Union Station (8-inch); general post-office to Back Bay Station (6-inch). Operating hours, 4 a. m. to 11 p. m.]	
superintendent	\$900. 00
repair men, at \$780	1, 560. 00
rent repair shop	600. 00
power for repair shop, electric, 5 horsepower	450. 00
substitutes, at \$600	1, 200. 00
inspector	600. 00
engineers:	
General post-office, 2 at \$780	\$1, 560. 00
Back Bay, 1 at \$780	780. 00
1 oiler for cleaning	600. 00
Oil, waste, 3 stations, each \$300	900. 00
	3, 840. 00
telephone service, 3 lines, private wire	400. 00
insurance	600. 00
taxes on plants	2, 500. 00
city of Boston tax on gross earnings, average 1½ per cent	1, 265. 00
	13, 915. 00
operating expenses:	
Line to Northern Station	23, 269. 80
Line to Southern Station	22, 539. 00
Line to Back Bay Station	23, 311. 00
	83, 034. 80

NOVEMBER 17, 1900.

Estimate of cost of construction 8-inch system for sliding carrier from general post-office to Southern Union Station.

[Distance, 3,750 feet = 0.71 mile.]

500 feet of pipe, at \$1.35	\$10, 125. 00
500 feet of pipe laid, at \$0.35	2, 625. 00
750 cubic yards excavation, at \$3.50	13, 125. 00
sets bends, at \$300	3, 600. 00
reducers, at \$50	2, 400. 00
drips, at \$12.80	128. 00
machine work	500. 00
	\$32, 503. 00
terminals:	
2 transmitters, 1 closed receiver, 1 open receiver	4, 000. 00
100 steel carriers, at \$18 each	1, 800. 00
	5, 800. 00
	38, 303. 00
power plant:	
2 compressors, at \$2,200	4, 400. 00
2 motors, at \$1,200	2, 400. 00
Foundations	1, 000. 00
Air piping	1, 300. 00
Air tanks, etc	750. 00
	9, 850. 00
	48, 153. 00
engineers	2, 000. 00
freight, cartage	3, 000. 00
	5, 000. 00
	53, 153. 00
10 per cent for contingencies	5, 315. 00
	58, 468. 00

NOVEMBER 17, 1900.

Estimated operating expenses 8-inch sliding carrier system from general post-office to Southern Union Station.

[Operating between the hours of 4 a. m. and 11 p. m.]

Rent, Union Station, 50 by 50.....	\$2, 500.00
4 operators, at \$780.....	3, 120.00
Wear and tear account, 20 carriers per month, at \$3.95, \$79 per month, per year.....	948.00
Power room: 40 horsepower, 3 cents per kilowatt hour, \$19 per day, yearly.....	6, 935.00
Depreciation of power plant, 10 per cent.....	1, 565.00
Depreciation of pipe line, 5 per cent.....	1, 625.00
10 per cent on investment (\$58,468).....	5, 846.00
	<hr/>
	22, 539.00

NOVEMBER 17, 1900.

Estimate of cost of construction 6-inch system for sliding carrier from general post-office to Back Bay post-office.

[Distance 7,240 feet = 1.37 miles.]

14,480 feet of pipe, at \$1 per foot.....	\$14, 480.00
14,480 feet of pipe laid, at \$0.30.....	4, 344.00
4,000 cubic yards excavation, at \$3.....	12, 000.00
2,833 cubic yards excavation, at \$2.25.....	6, 374.00
300 feet brass bends, at \$10 per foot.....	3, 000.00
40 reducers, at \$25.....	1, 000.00
10 drips, at \$12.80 each.....	128.00
Machine work.....	400.00
	<hr/>
	\$41, 726.00
Terminals:	
2 transmitters, at \$500 each.....	1, 000.00
2 open receivers, at \$300 each.....	600.00
100 carriers, at \$15 each.....	1, 500.00
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	3, 100.00
	<hr/>
	44, 826.00
Power plant:	
2 compressors, at \$2,200 each.....	4, 400.00
2 motors, at \$1,200 each.....	2, 400.00
Foundations.....	1, 000.00
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	7, 800.00
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	52, 626.00
Air piping.....	1, 000.00
Tanks and fittings.....	600.00
Freight and cartage.....	3, 000.00
Engineers.....	2, 000.00
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	6, 600.00
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	59, 226.00
10 per cent for contingencies.....	5, 922.00
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	65, 148.00

NOVEMBER 17, 1900.

Estimate of operating expenses 6-inch sliding carrier system from general post-office to Back Bay post-office.

[Operating between the hours of 4 a. m. and 11 p. m.]

4 operators, at \$780.....	\$3, 120.00
Wear and tear account, 40 carriers per month, at \$3.10, \$124 per month, yearly.....	1, 488.00
Power room: 52 horsepower, 3 cents per kilowatt hour.....	9, 015.00
Depreciation of power plant, 10 per cent.....	1, 090.00
Depreciation of pipe line, 5 per cent.....	2, 084.00
Interest on investment, 10 per cent.....	6, 514.00
	<hr/>
	23, 311.00

NOVEMBER 17, 1900.

Estimate of operating expenses 8-inch system for sliding carrier, general post-office to Northern Union Station.

[Operating between the hours of 4 a. m. and 11 p. m. 0.74 mile.]

Rent	\$480.00
Light and heat	400.00
Operators, at \$780	3,120.00
Wear and tear account, 12 carriers per month, at \$3.95, \$47.40 per month, yearly	568.80
Power room: 55 horsepower, 3 cents per kilowatt hour	9,535.00
Depreciation of power plant, 10 per cent	1,200.00
Depreciation of pipe line, 5 per cent	1,634.00
Interest on investment, 10 per cent	6,332.00
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	23,269.80

NOVEMBER 17, 1900.

Estimate of cost of construction 10-inch system from general post-office to Back Bay post-office.

Distance, 8,250 feet. Difference in distance between this line and the 6-inch line is on account of street construction, being unable to follow the same course of the 6-inch line with 10-inch pipes necessitating using other streets.]

6,500 feet of pipe, at \$1.12	\$18,480.00
6,500 feet of pipe laid, at \$0.45	7,425.00
5,000 cubic yards excavation, at \$3.50	15,750.00
1,000 cubic yards excavation, at \$2.50	10,000.00
5 sets bends, at \$170	2,550.00
10 drips, at \$12.80	128.00
Machine work	1,000.00
	<hr/>
	\$55,333.00
Terminals:	
2 transmitters, at \$1,000	2,000.00
2 receivers, at \$500	1,000.00
100 carriers, at \$25	2,500.00
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	5,500.00
	<hr/>
	60,833.00
Power plant:	
2 compressors, at \$3,500	7,000.00
2 motors, at \$1,400	2,800.00
Foundations	1,600.00
Air piping	3,000.00
Air tanks and fittings	750.00
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	15,150.00
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	75,983.00
Engineering expense	2,800.00
Freight, cartage	5,200.00
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	83,983.00
10 per cent for contingencies	8,398.00
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	92,381.00

NOVEMBER 17, 1900.

Estimate of operating expenses 10-inch system from general Post-Office to Back Bay post-office.

Operators, at \$780	\$3,120.00
Wear and tear account, 30 carriers per month, at \$2.10 each, \$63 per month, per year	756.00
Power room: 50 horsepower, at 3 cents per kilowatt hour	8,668.00
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	12,544.00
Depreciation of power plant, 10 per cent	2,065.00
Depreciation of pipe line, 5 per cent	2,766.00
10 per cent on investment	9,238.00
	<hr/>
	26,613.00

BOSTON PNEUMATIC TRANSIT COMPANY,
Boston, Mass., November 19, 1900.

J. M. MASTEN, *Chairman of Commission.*
 GEORGE A. HIBBARD, *Postmaster, Boston, Mass.*

GENTLEMEN: I send you herewith estimates of the American Pneumatic Service Company of the cost of construction of a pneumatic-tube system connecting the South Union Station and general post-office, and also the Back Bay Station with the general post-office, using 6, 8, and 10 inch diameter pipe, as will appear upon reference to the several estimates. We also submit a fair price for the rental of these systems to the Government for its exclusive use for carrying mails, this company to furnish power. The estimate for leasing these systems embraces also an increase of the present rental of the line to the North Station, because the present rental of that line is entirely inadequate. As to the price named for power in the estimates of operating expenses, if the Government should choose to furnish its own power the amount charged would be deducted, and there should also be deducted the depreciation of power plant as well in such case.

These figures are based upon experience in construction at present being carried on here in Boston, and upon the present market price for materials. Of course these might be affected by changes, but apparently the figures submitted will be found correct and to be relied on for the next year or two.

Respectfully submitted.

BOSTON PNEUMATIC TRANSIT COMPANY,
 W. E. L. DILLAWAY, *President.*

BOSTON, MASS., *November 20, 1900.*

HON. W. S. SHALLENBERGER,
Second Assistant Postmaster-General, Washington, D. C.

SIR: The joint committee on pneumatic-tube service proposed for this city have had a further meeting for the consideration of the subject as it applies to the city of Boston, and to shorten somewhat the final report, which is herewith submitted, beg to refer to the preliminary report under date of October 6, 1900, which embodied recommendations for the establishment of pneumatic-tube service between the general post-office and the South Terminal Station, a distance of 3,750 feet, which line shall be such as will provide for the interchangeability of carriers with the present service, extending from the general post-office to the North Union Station. It also proposed a line between the general post-office and the Back Bay Station, a distance of 8,250 feet, the tube to be of a 6-inch diameter; but further investigation shows that it is practicable to construct a tube of this size between the points named by a shorter and more direct route, of about 7,240 feet in length. We refer to this preliminary report, and renew the recommendation for the establishment of this service between the points named, provided that the proposals shall be upon a reasonable basis of cost, and compare with the expense of installing such systems in other cities.

The consideration of this subject has resulted in conferences with the Boston Pneumatic Transit Company, which is the only company known to this committee which is in a position to install the desired service, and the estimates submitted by this company are herewith forwarded, for such consideration and verification as the Department may decide upon. The estimates submitted by the company named include an estimate for the continuation of the present system, which is in operation between the general post-office and the North Union Station. The general expenses of the operation of the company of the

ground proposed to be covered being given as a whole, and the separate items, showing the cost of operation of the line to the North Union Station, to the South Terminal Station, and to the Back Bay Station, collectively amounting to \$83,034.80. These items are divided as follows:

General operation expense	\$13,915.00
Operation expense:	
North Union Station	23,269.80
South Terminal Station	22,539.00
Back Bay Post-Office Station	23,311.00
	83,034.80

and also a separate proposition, estimating on the cost of construction and operation of a 10-inch tube system, between the general post-office and the Back Bay Station, a distance of 8,250 feet; but owing to the necessity of avoiding the subway this line follows different streets than the 6-inch tube referred to, making a total distance of 8,250 feet. The annual cost of operation of the 10-inch tube system appears to be \$3,300 over the cost of the 6-inch line. This committee indicates its preference for the 6-inch line between the general post-office and the Back Bay Station, first, because of the lesser cost of construction and because it is believed that the 6-inch line furnishes sufficient capacity for the transmittal of the first-class and such other classes of mail as it may be necessary to send.

In forwarding the estimates submitted by the Boston Pneumatic Transit Company to the Department for its consideration this committee does not indicate its entire approval of the figures submitted, but leaves them to be verified by expert testimony.

These estimates include the cost for power for the operation of the whole system, to the amount stated, as \$25,585, which can be materially reduced by arranging with the Treasury Department for the operation of the new lines as is now done for the line to the North Union Station, at approximately one-half of the amount stated. The charge for other items, such as motors, etc., at the different terminals would also be reduced.

In fairness to the company submitting this proposal it should be stated that the proposition was submitted on this basis, because it was believed that there might be a difficulty in arranging for the continuation of power through the Government plant, but the figures given for the cost of the electric power is stated as exactly the amount charged for such power by the Electric Lighting Company.

These estimates are submitted by the company, with the statement that the items of construction are upon the basis of the lowest cost possible, and that the operating expenses shown are also estimated upon a low basis. They are estimates as definite as can be furnished at this time, and are based upon the present prices for material, that is, iron pipe, machinery, and labor. It is stated by the president of the company that any contracts that may be given to his company will be entered into upon a fair basis and at the lowest price possible.

In explanation of the apparent importance of the pneumatic-tube service between the general post-office and the South Terminal Station, it is stated that the amount of first-class mail to be transmitted will approximate 388,000 pieces daily of outgoing mail, and almost the same quantity of incoming. There is sent through the pneumatic tube

to the North Union Station at present about 245,000 pieces of first-class mail daily, together with quantities of paper mail between the hours of 8.30 and 11.30 a. m., and at such other hours as the tube is not in use for the handling of first-class mail. The gain in dispatch of first-class mail over the former wagon service is reported to be 10,925 pieces. The time in transit by wagon to the North Union Station is twenty minutes, and by tube one and one-half minutes, an apparent gain of eighteen and one-half minutes in transit between these two points; to the South Terminal Station the time allowed by wagon is ten minutes, and by tube would be one and one-half minutes, an apparent gain of eight and one-half minutes in transit between this station and the general post-office; the time between the general post-office and the Back Bay Station by street railway postal car is now twenty-two minutes, elapsed time, and by pneumatic tube would be two and two-thirds minutes, a gain of nineteen and one-third minutes over the present system.

The tables prepared, showing the amount of mails handled, show 128,300 letters dispatched from the Back Bay to the general post-office, and 167,156 letters in the opposite direction. These tables are attached herewith and made a part of the report, and give in detail the amount of mail delivered and collected, the "drops," special-delivery letters mailed and delivered, and the character of the present service.

It may be interesting to consider in connection with the estimates for pneumatic-tube service the cost of the present transportation service in this city. This, stated in round figures, is as follows:

Street-railway postal-car service	\$21,000
Tube service to North Union Station	9,000
Wagon service to North Union Station	9,000
Wagon service to South Terminal Station	18,000
Wagon transfer service between railroad stations	8,000
Total	65,000

The cost of such service, as estimated, would be as follows:

Pneumatic-tube service, as proposed	\$83,000
Street-railway postal-car service	21,000
Transfer service between depots	8,000
Wagon service, estimated necessary from general post-office to North Union and South Terminal stations	20,000
Total	132,000

This would appear to be an increase of 100 per cent in the present cost of transportation service in this city, but it should be borne in mind that the contract wagon service, to be given out under the present letting, to begin July 1 next, will by any fair rate of increase, provided the pneumatic-tube service to the North Union Station were discontinued, amount to about \$57,000, and with the cost of the present street-railway postal-car service, \$21,000, make a total cost of \$78,000.

This still leaves quite a margin of increase over the present cost, which will have to be made up by the increased business within the city, and especially the special-delivery service. The latter service in the district of the Back Bay post-office and adjacent branch offices is at present quite large and a substantial increase may be expected by providing a quicker service, anticipated by the pneumatic tube. The growth of first-class mail in the city of Boston has been very large, and it will also show the effects of any expedited service provided.

The pneumatic tube to the North Union Station is of a diameter of 8 inches inside, and the carriers a little less than 7 inches. This size tube is suggested for the line to the South Terminal Station because of the necessity of an interchange of carriers without repacking at the general post-office. The quantity of mail to be carried on each line is very heavy, and the transfer from one railroad station to the other also large and important. It is the intention of Postmaster Hibbard to eventually provide for arranging post-office facilities at the railroad depots, and the inauguration of a complete pneumatic-tube service between the general post-office and the North and South Union depots would therefore give increased importance. The 8-inch tube, it is believed, will have sufficient capacity, especially with the improved machinery with which it is now proposed to equip these lines, to provide for the growth of mail within the next decade.

The space for the installation of the necessary machinery at the general post-office, the South Terminal Station, and the Back Bay Station can be arranged for without expense to the Department, except at the South Terminal Station where the proposition submitted by the company covers the amount of necessary rental.

The pneumatic tube in operation in this city is operated under the Batcheller patents, and has proven successful. It is the only system known to this committee which is in practical operation in carrying the mails. However, the experimental system, owned by the American Pneumatic Service Company, and in operation experimentally at Lowell, Mass., has been inspected by us, as stated in the preliminary report; but its entire feasibility can not be passed upon by us, and it is therefore suggested that competent engineering authority should be provided for such a test.

It is proposed to rearrange the street-railway postal-car routes of the Brighton, Roxbury, and Cambridge districts, so as to have them head from the Back Bay Postal Station instead of the general office, with the exception of a very few trips, and thus allow of the performance of better service to the branch post-offices beyond the Back Bay Station. The Boston Elevated Railway Company has refused to increase the mileage of the street postal-car service under the present rates, but the reduction of the mileage in the general post-office district will allow of the reduced mileage to be used in the districts named to very great advantage.

A map of the city is also attached to this report, with the present pneumatic line shown in blue and the proposed line in red colors.

We remain, very respectfully,

GEO. A. HIBBARD,
Postmaster.

EDW. J. RYAN,
Superintendent Railway Mail Service.

J. M. MASTEN,
Chairman.

E. W. ALEXANDER,
Committee.

Pneumatic tube statistics from 12 m. November 15 to 12 m. November 16.

[Present service of electric R. P. O. cars.]

General post-office to—	Dis- tance.	Revenue.	Trips.	Time.	Per cent of first- class local mail.	Mail delivered.		Mail collected.
						First class.	Other classes.	
	<i>Miles.</i>							<i>Trips.</i>
General post-office		\$2,054,806			14	4	7	225
Back Bay	1.52	163,886	16	15	20	4	6	10
South End (Station A).....	<i>a</i> 3.46	109,866	12	<i>a</i> 25	5	4	5	11
Roxbury	4.54	68,018	12	32	3	3	4	7
All stations going via Back Bay tube:								
Boxbury Crossing.....	3.65	24,055	13	25	5	4		7
Brookline.....	4.12	31,233	8	35	8	2	4	7
Boulevard.....	6.50	<i>b</i> 10,981	7	50	8	4		6
Brighton.....	8.25	17,278	7	60	10	3		5
Cambridgeport.....	4.02	68,398	8	25	20	4		7
Cambridge.....	5.06	65,161	8	33	20	3	4	7
North Cambridge.....	6.39	11,990	7	40	5	4		6
Dorchester.....	7.22	21,710	10	40	15	3	4	5
New Dorchester.....	9.02	15,586	11	55	4	4		5

a Via Back Bay.

b Estimated.

General post-office to—	Mail delivered.		Mail collected.		Drops.		Special delivery.	
	First class.	Other classes.	First class.	Other classes.	First class.	Other classes.	Mailed.	De- livered.
General post-office			175,156		199,956		545	547
Back Bay	44,125	25,216	20,650	1,376	6,950	9,624	89	61
South End (Station A)...	21,543	9,544	28,584	16,260	1,840	1,355	44	13
Roxbury	33,190	14,512	12,750	6,912	8,925	1,708	34	59
All stations going via Back Bay tube:								
Roxbury Crossing...	8,500	2,720	3,750	768	1,125	1,448	3	17
Brookline.....	5,243	3,759	1,460	44	1,122	629	9	14
Boulevard.....	4,553	4,764	1,454	456	853	7,831	8	9
Brighton.....	4,175	2,368	1,625	288	525	88	4	6
Cambridgeport.....	17,150	6,973	7,155	547	7,980	2,490	5	15
Cambridge.....	9,557	9,505	6,316	374	2,246	3,446	26	70
North Cambridge.....	2,770	2,192	1,201	99	620	264	6	9
Dorchester.....	9,735	6,060	5,610	1,549	880	712	11	18
New Dorchester.....	6,515	3,208	4,150	360	550	184	6	15

OFFICE OF SUPERINTENDENT OF MAILS,
Boston, October 6, 1900.

Mr. J. M. MASTEN,

Member of Committee on Pneumatic-Tube Service.

SIR: I beg to submit the following information:

City and stations mail.—By recent count the total number of letters for Boston city originating at the general post office, Boston, was 43,750, and the total number of letters for Boston stations originating at the general post-office, Boston, was 43,688.

Wagon service between general post-office and Northern Union Station.—At the present time 39 trips are required from the general post-office to the Northern Union Station, and 16 from the Northern Union Station to the general post-office. In the event of cessation of pneumatic-tube service the number of trips from the general post-office to the Northern Union Station would have to be increased to 59, and the number from the Northern Union Station to the general post-office would have to be increased to 57.

Amount of mail dispatched between former regular closing and present closing hours.—A recent actual count showed that in twenty-four hours the number of letters dispatched between the former closing hours and the present was 10,925. That is, that number of letters was forwarded in earlier mails than would have been possible under the former system of dispatch when the pouches were made up at the general post-office instead of the tube room.

Respectfully,

E. A. REED,
Superintendent of Mails.

[Copy of statement from Superintendent of Mails Reed.]

Agreeably to your request, I submit the following statement regarding the operation of the pneumatic tube between Boston post-office and the North Station. The tube is in constant use twenty hours out of the twenty-four each week day and Sunday.

All first-class mail received at the station for Boston and the postal stations of Boston, besides a large amount which is destined for points outside of Boston, passes through the tube, and all first-class matter originating in Boston, and a larger amount from points south and west of Boston passes through the tube. We also dispatch through the tube, between the hours of 8.30 a.m. and 11.30 a.m., all paper mail due to be dispatched from the North Station. By doing this we have reduced the number of wagon trips from 47 to 32 outward, and from 23 to 16 inward. The difference in time between the wagon service and the tube service is about thirty minutes in favor of the tube.

By the tube service we avoid all delays consequent on congested streets, bad traveling through the winter months, and many other disturbing conditions. We find it of great advantage to the office as well as to the public to have facilities for dispatching direct from the station. The various railway post-offices arriving at the North Station make up direct packages of mail for all outgoing lines carrying mail, thus saving time and delay and loss of connection incident to sending them to the general post-office. The same applies to mails made up in the larger offices on the Northern and Eastern lines.

Previous to the adoption of the tube service the contract price for mail-messenger service, including all service, was about \$49,000. At present the contract price is \$18,000 for tube service, \$8,000 for transfer service, and \$18,000 for the service between the general post-office and the South Station; a total of \$44,000.

Count taken August 27, 1900.

Mail sent to tube room, North Station, via tube:	
Letters	225, 720
Circulars	20, 000
	<hr/>
* Pieces	245, 720
This includes all first-class matter.	
To South Terminal Station:	
Letters	348, 000
Circulars	40, 000
	<hr/>
* Pieces	388, 000

NEW YORK.

TUBULAR DISPATCH COMPANY,
New York, October 8, 1900.

Hon. CH. EMORY SMITH,
Postmaster-General, Washington, D. C.

SIR: In reply to your letter of July 25, handed to us by your representative, and asking us for information and proposals under four specific heads, we have the honor to reply in the same order as your inquiry, to wit:

In reply to your first inquiry: The charter granted to this company by the legislature of this State and the franchises acquired from the city of New York authorize it to build and operate pneumatic tubes for the transportation of merchandise, messages, and numerous other uses besides the transportation of United States mail. We are advised by counsel that we can not dispose of the system of pneumatic tubes without invalidating our rights for the construction of pneumatic tubes for other purposes over the same routes, and that we would by

* Paper mail is sent through the tube between the hours of 8.30 a. m. and 11.30 a. m.

sale relinquish other valuable rights and privileges. The sale, therefore, of the present system to the Government would not be feasible, unless the purchase included all our properties, franchises, and patents.

The cost of the property, franchises, and patents of this company, including the construction of the present system, stood upon our books on June 30 last at \$2,153,005.41. The capital stock of this company issued is \$1,500,000. The bonded indebtedness of this company is \$600,000. These bonds, under the terms of the contract with this company and its bondholders, can be arbitrarily called and redeemed by the company at 110 per cent of par value. Fifty-five thousand five dollars and forty-one cents of the surplus of this company has been used and expended in perfecting its property and other betterments.

If the Government desires to acquire the existing system and the franchises, patents, and other properties of this company, we believe that the necessary authority can be obtained from our State legislature, and that our stockholders and bondholders will consent to such sale upon reasonable price and terms. At this time, however, the officers of this company have no authority from the stockholders or bondholders to dispose of the assets of this company.

The officers of this company believe that the investigation now being carried on by you under the authority of Congress will convince the Government that the mail can be transported more economically and efficiently by arrangement and contract at the terms herein proffered by this company.

In reply to your second inquiry: The terms on which we will agree to carry the mails through the system of pneumatic tubes as it now exists from June 30, 1901, to June 30, 1902, is the renewal of the present contract price upon the same terms, the Government to furnish the power, as heretofore, at the general post-office. If the Government desires that this company furnish the power at the general post-office, we will do so at the actual cost, which at the present time is \$8,600, making a total rental of \$167,100. The cost of construction of the present system and the limited scope of operation prevent this company from making a lower rental. The cost of the present system includes the cost of plans, patterns, etc., but not the cost of franchises and patents, and the cost of operation necessarily is as great in many respects as would be the cost of operation of a line of much greater mileage. Reductions in the expense of construction and operation can only be accomplished by the extension of the system, which we clearly demonstrate in our reply to your third and fourth inquiries.

In reply to your third inquiry: The plans for the proposed pneumatic mail tubes in the city of New York approved by Hon. Cornelius Van Cott will call for the building of 36.04 miles of 8½-inch tube, making the total mileage 46.62 miles of single tube, the total system being 441 per cent of the present mileage, and will comprehend also the alteration, fitting, etc., of 21 new postal stations added to the 6 already in operation, making the total postal-station machines of complete system 27. or 350 per cent of the present stations. The machinery to be of improved design, requiring less floor space. The carriers will be 30 inches long, or 25 per cent larger than those in use on the present system.

We are advised by counsel that our charter and franchises do not give us the right to construct an independent system for the United States Government, and for reasons similar to those herein stated, in reply to your first proposition, we can not sell to the Government any

extension of our system nor any franchise for extension without express authority of the State legislature and of our stockholders and bondholders.

But for your information we will state that, from the careful estimates furnished by our engineers, this company would require approximately \$925,500 to construct the new extension system as approved by Postmaster Van Cott. These figures do not include the cost of any franchise or patent, but simply labor, material, and expense that would be incurred in the actual building of the line, provided this company obtained the necessary legal authority and consent for such work.

In reply to your fourth inquiry: We hereby propose that we will enter into a five-year contract with the United States Government, duly authorized by Congress, to transport mail within the capacity of our tubes for the complete system as per map approved by Postmaster Van Cott for the annual consideration of \$398,500.

The proposed complete system will have a mileage of 441 per cent of the present mileage, and terminal points and machines 350 per cent of the present number, while the charge, including all power, if any, is only 238 per cent of the present rental, and 54 per cent of the present charge per mile, including power, the carriers for the new extensions having a carrying capacity 25 per cent greater than the carriers of the present system.

This proposition is made on the presumption that the Government will reorganize its present methods, discontinue the use of wagons for transporting all matter within the capacity of the tube, and so avail itself of a greater portion of the capacity of said tubes.

With the increase of the size of the carriers, as before indicated, we believe the tube system will carry all classes of mail to and between all branch post-offices in the city of New York, and all of the mail between the main post-offices and the terminal stations reached by the tube in the city of New York, except the bulky publishers' mail—otherwise second-class matter—the bulk of the transportation of which the Government can be relieved of by revision of its methods.

You are asked to note that, of the amount stated, approximately \$60,000 will be disbursed by the company to the station operators, whose duty it is to load and empty the carriers and to receive and dispatch them, the labor thus performed being identical with that now performed by employees of the post-office, who handle, lock, unlock, receive, and dispatch the mail pouches and sacks in the wagon service. In the operation of the pneumatic tubes our operators replace the employees who handle mail sacks in proportion to the extent that the Government avails itself of the tube system in substitution for wagons; and as the machines can be located convenient to the sorting cases, or mechanical means for taking the carriers to said sorting cases can be adopted and installed, so enormous savings in time and labor will result, to the advantage of the Government and its employees.

A further sum of the amount stated, of over \$136,000, will be expended by this company in supplying power to operate its machinery and the purchase thereof, a considerable portion of said \$136,000 being paid to engineers, firemen, oilers, mechanics, and other employees, corresponding with the wages now paid by the Government to employees, and by the contractors to drivers, and maintenance of the equipment and establishments of the wagon contractors.

Your particular attention is called to the fact that in the proposed contract consideration there is no item included for the use of any

patent, and that all the material and labor covered in the estimates are for the Government service alone and its proper supervision. This company, by law, is obliged to pay a rent to the State for the use of streets or tunnels occupied by its tubes, said rent or taxes being same that is demanded by State law for similar rights of all companies and individuals, for public or private use, within the city of New York. The estimate of said rental paid the city for the tubes to be used by the Government is approximated at \$18,000.

In the price named by this company has been included less than 10 per cent on the actual cost of construction of the new and old lines combined, thus securing a moderate interest on the money expended, and providing a reasonable percentage per annum for the replacing of its present system after a use estimated at twenty years.

This company owns its own patents and pays no license to any company or individual; nor has it any interest in any company outside of New York or Brooklyn, nor is it influenced by other cities or directed by any other than its own officers or stockholders. Its officers are elected and its management and policy dictated by its stockholders owning a majority of the stock, who have no interest, direct or indirect, in the company from which it originally acquired its patents.

The value of the pneumatic dispatch in commercial work entirely outside of Government mail service is apparent to all who have watched the operation of the present system since its introduction, and in making the foregoing liberal proposition to the Government, it is proper to state that the company looks to such commercial business, through the building of additional commercial lines, for its return for franchises and patents. It is only by anticipating returns in this direction that the cost and charges herewith tendered to the Government can be justified.

At the present state of the art, we believe it is better that the operation and management of pneumatic tubes should be left to those who are experienced and skilled in their construction and operation, both on account of safety and economy. The operation of a complete system, as proposed, for, say, a term of five years, will demonstrate to the Government its true value for mail purposes. It will also give abundant opportunity for improvement of service, and more general education in the operation and management of pneumatic tubes, which is now confined to a limited number. After the expiration of said contract, if it be apparent to the Government that it can effect economy and improvement by the purchase and operation of the pneumatic-tube system, this company will cooperate with the Government for the acquirement of the system on a basis that is fair to its stockholders and the Government.

As an evidence of good faith, and to enable you to carry out to the fullest extent the resolution of Congress, we hereby tender to you the privilege of examining our maps and estimates, to employ an engineer and accountant to verify all our costs and estimates, and to note the difficulties and conditions under which our work must be performed. The only restriction and stipulation we desire to make pertaining to such examination is that the data shall not be published for the guidance of other pneumatic-tube companies, but shall be for your information in making your report to Congress, and for the information of the proper committees of Congress as confidential matter.

Respectfully submitted,

W. A. H. BOGARDUS,
Vice-President and General Manager.

REPORT ON PNEUMATIC-TUBE SERVICE FOR NEW YORK CITY.

New York, *October 9, 1900.*

Hon. W. S. SHALLENBERGER,
Second Assistant Postmaster-General.

SIR: In accordance with the Postmaster-General's Order 989 of August 13, 1900, the undersigned, the postmaster at New York and the division superintendent of Railway Mail Service at New York, constituting a local committee under the terms of the above quoted order, beg to present the following report in reference to the existing and prospective pneumatic-tube service for the transmission of mail at New York.

According to the instructions contained in Order 989, the following report seeks to cover:

- First. The necessity for pneumatic-tube mail service;
- Second. The proper extension of such service;
- Third. The volume of mail to be transmitted;
- Fourth. The size of tube for present or prospective demands;
- Fifth. The space available at terminal and intermediate stations for installation and operation;
- Sixth. The most economical and practical system of installation and maintenance;

- Seventh. The possible use of single lines of small tubes as feeders;
- Eighth. The feasibility of recommending that additional postage be collected on first-class matter passing through the tubes.

Before treating of the necessity for the tube service, it may be well to outline the pneumatic tube service which now exists in connection with the New York post-office.

EXISTING PNEUMATIC-TUBE SERVICE.

The pneumatic-tube service now in operation at the New York general post-office, with the date of commencement, length of lines, etc., is as follows:

Tube commenced operation.	From—	Via—	To—	Distance by car or wagon.	Distance by tube.
				<i>Miles.</i>	<i>Miles.</i>
Oct. 15, 1897 ..	New York general post-office.	.....	Branch P.	0.70	0.77
Mar. 3, 1898 ..	.....do	Branch D, Madison Square and F.	Branch H.	3.44	4.41
Aug. 1, 1898 ..	.....do .....	.....	Brooklyn general post-office.	1.60	1.65
Total ..	.....	.....	.....	5.74	6.83

Present hours of operation:

New York general post-office to Branch P:	Hours.
Week days, 5 a. m. to 9 p. m.	16
Sundays, 5 a. m. to 9 a. m.	4
New York general post-office to Branch H:	
Week days, 4 a. m. to 9 p. m.	17
Sundays, 4 a. m. to 9 a. m.	5
New York general post-office to Brooklyn general post-office:	
Week days, 4 a. m. to 11 p. m.	19
Sundays, 4 a. m. to 9 a. m.	5

It will thus be seen that the existing service connects the general post-offices at New York and Brooklyn, and also five important branches of the New York post-office.

The existing service covers 5.74 miles of mail route and 6.83 miles of double pneumatic tubes, the length of single pneumatic tube being about twice as much as the last-mentioned figures.

ADEQUACY OF EXISTING TUBE SERVICE.

The pneumatic tube used in New York is 8 inches in diameter, inside measurement. The carriers sent through the tube are $6\frac{3}{4}$ inches in diameter, inside measurement, and are $22\frac{1}{2}$ inches long, inside measurement (24 inches outside measurement).

The working capacity of a carrier is 500 pieces of letter mail in packages. It is possible to pack in 600 letters loose, but in ordinary practice this would not be desirable.

There are times in the day when only a fraction of the capacity of the tubes is utilized. During the heaviest hours of the day the present tubes have thus far proven adequate to convey all first-class mail.

The Tubular Dispatch Company of New York (the contractors) have recently suggested that they could easily increase the length of the carriers from 24 inches to 30 inches, thus increasing the capacity of the tube, on the same headway, 25 per cent.

It would therefore seem that the adequacy of the 8-inch tube now employed in New York is practically assured, for some time to come, to meet all reasonable demands in the transmission of first-class mail matter.

On the basis of a test count made during the first week in May, 1900, the total amount of first-class mail dispatched through the several tubes per annum would be as follows:

	Branch P circuit.		Branch H circuit.		Brooklyn circuit.	
	Total.	Per day.	Total.	Per day.	Total.	Per day.
Pieces.....	53,001,000	145,600	276,156,400	758,650	53,081,600	145,850
Pounds.....	1,060,020	2,912	5,523,128	15,173	1,061,632	2,917

Among the paper mail which is incidentally transmitted daily through the tube there are 1,099 pounds, representing 6,502 copies, of daily papers transmitted for speedy city delivery or close train connection.

SPEED, FREQUENCY, AND RELIABILITY.

The speed at which carriers are transmitted through the tube is as follows:

	Miles per hour.
General post-office to Branch P	32.76
General post-office to Branch H	29.40
General post-office to Brooklyn general post-office.....	31.33

The frequency of regular transmissions through the tube is as follows:

	Week days.	Sundays.
General post-office to Branch P.....	32	8
General post-office to Branch H	35	11
General post-office to Brooklyn general post-office	39	11

In addition to the regular dispatches, which are largely based on a half-hourly schedule, there are frequent dispatches of made-up mails from the post-office or received from other post-offices, and special-delivery letters, which are dispatched according to instructions as soon as received and without waiting for the half-hourly interval.

The reliability of the service has been well tested by the experience of two to three years; and, generally speaking, there have been very few irregularities or causes for complaint. These may be more specifically set forth by relating the actual experience from January to September, 1900, nine months. During that time there have been 18 irregularities reported in connection with the New York tubes running to Branch H and Branch P. These 18 cases include suspensions of service varying from a minimum of five minutes to a maximum of thirteen hours and fifty minutes. The total detention in these 18 cases was twenty-three hours and fifty-four minutes, or about one-half of 1 per cent of the aggregate number of working hours during the whole nine months. During two of these months—viz, April and July—there were no irregularities whatever.

During the same period of nine months, in the case of the Brooklyn tube there were three irregularities, the detentions varying from thirty minutes to two hours and forty-five minutes, or a total of three hours and forty-three minutes, this being equal to about one-twelfth of 1 per cent of the aggregate working hours during the period. In the case of the Brooklyn tube there were no irregularities whatever during the months of January, February, March, April, July, and September.

ADVANTAGES OF TUBE SERVICE IN COMPARISON WITH OTHER SERVICE.

The first and most important advantage of the pneumatic-tube service in comparison with other service is its speed. The distance between the general post-office and Branch H is 3.44 miles, and the time allowed by wagon trips between the two points is forty-five minutes, or at the rate of $4\frac{1}{2}$ miles per hour. The wagons convey the paper mail between these points and intermediate branches; and previous to the establishment of the pneumatic tube the letter mail was mainly conveyed by street-car service.

The time in transit by means of the street-car service was twenty-nine minutes for the street car and twelve minutes for messenger service at the general post-office and Branch H, to and from the cars, making a total of forty-one minutes. The time occupied in transmission by the tube is nine minutes (or at the rate of 29 miles per hour); and it has been made in a little over seven minutes.

If we make the comparison for letter mail alone, we compare the tube time (nine minutes) with the former street-car time (forty-one minutes), showing a gain of about 80 per cent in time for each trip.

Between the general post-office and Branch P, a distance of 0.71 mile, both letter and paper mail were carried by wagon, and the transit time was fifteen minutes—a speed of less than 3 miles per hour. The transit time by the tube is one and one-fourth minutes, a speed of nearly 33 miles per hour, or a reduction of 91 per cent.

Between the New York general post-office and the Brooklyn general post-office, a distance of 1.65 miles, both letter and paper mail were conveyed by wagon; time in transit, twenty-seven minutes, or at a speed of $3\frac{1}{2}$ miles per hour. The transit time of a carrier through the tube is three and one-tenth minutes, or at the rate of over 31 miles per hour; or a reduction of 88 per cent.

In addition to the advantage of speed, there is also a saving in time by doing away with messenger service between the post-office, or branch post-offices, and the cars; and the saving in time which arises from congestion at the doors of the post-office, where it is frequently necessary for mail wagons to wait to be unloaded, because of other wagons arriving at the same time, or because of the arrival of wagons containing second-class mail matter from the publishers.

There are also the incidental and minor advantages of exemption from street blockades or slow travel, due to heavy snow falls, etc.; and further, the better protection to the mail, because of its being less liable to depredation en route. These advantages, while comparatively subordinate to the item of speed, are certainly well worthy of mention.

Another very great advantage for important first-class matter, and especially special-delivery letters, is the availability of the tube for immediate dispatch. Before the establishment of the tube, the frequency of dispatch between branch stations was on the basis of a trip every half hour during the greatest portion of the day. Since the tube has been in operation, the urgent first-class matter, such as special-delivery letters, and also any made up packages of letters from the post-office or in transit, which do not require to be sorted, are transmitted immediately through the tube.

While believing that the chief function of the pneumatic tube for mail transmission is to connect the general post-office and branches in cities where the surface traffic is necessarily at a low rate of speed, yet we can not overlook the advantage which occurs in certain cases in connecting the general post-office and branch post-offices with railway stations, especially where there is a considerable distance between the two points. The letter mails forwarded to the New York Central and New York, New Haven, and Hartford railroads, running out of the Grand Central Station, have been greatly advanced by using the tube from the general post-office to Branch H, which immediately adjoins the Grand Central Depot. The time allowed to mail wagons between the general post-office and the Grand Central Station is forty minutes, while the tube gives us a trip of nine minutes.

The full difference is not yet availed of, because of the allowance at Branch H of fifteen minutes margin for wagons between there and the Grand Central Depot. Changes are now in progress, however, at the depot, which will very much reduce this time, probably to five minutes. When we consider, however, that after the wagon arrives at the depot, a certain margin is necessary to get the wagon to the postal car and getting it ready for unloading, it seems fair to make the comparison between the two methods on the basis of time in transit; this showing a gain of thirty-one minutes for supplementary closings to all trains. It is computed that these supplementary closings have advanced about 20,000 letters a day.

REDUCTION IN WAGON SERVICE.

A very good illustration of the possibilities of reducing expenses for wagon service is obtained by contrasting the wagon service between the general post-office and Branch P, with the service that existed before the introduction of the tube service to that branch. It should be understood first that most of the branches of the New York post-

office receive their paper mail from the general post-office and each other by means of wagon service, route 407005, contract price, \$117,400 per annum, but they have received their letter mail by street car or elevated railroad service. In the case of Branch P, however, the only service in existence previous to the pneumatic-tube service, was by wagon, and consisted on week days of 33 trips each way, and on Sundays of 9 trips one way and 8 the other way, making a total of 413 trips per week. The service now in operation on week days is 10 trips to P and 13 trips from P, with the same Sunday service as previously, thus making 155 trips per week, and showing a reduction of 258 trips per week, or 62 per cent.

The wagon trips between the New York general post-office and the Brooklyn general post-office have been reduced from 33 to 23 each way on week days, and from 17 on Sundays to 16 one way and 15 the other way; thus showing a total of 307 trips per week, as compared with 430 formerly; a reduction of over 28 per cent.

The wagon trips between the general post-office and Branch H for city purposes have not been reported as showing any reduction, but a great reduction ought to be feasible whenever the pneumatic-tube service is extended, as will be referred to later on in this report.

IMPORTANCE OF BRANCH POST-OFFICES NOW CONNECTED BY TUBE.

The standing of the branch post-offices already connected by tube is very well indicated by showing their gross receipts for the fiscal year ended June 30, 1900, as follows:

Branch D.....	\$379,980.64
Branch F.....	89,414.54
Madison Square Branch.....	498,132.71
Branch H.....	525,180.27
Branch P.....	749,619.16

The gross receipts of these five branches amounted to \$2,142,327.32, or 22.9 per cent of the total receipts of the New York post-office and branches.

The receipts of Branch P are higher than those for cities like Minneapolis or St. Paul, Minn., or Detroit, Mich. The receipts of Branch H and the Madison Square Branch are higher than those of cities like Indianapolis, Ind., and Rochester, N. Y.; and from \$100,000 to \$200,000 greater than the receipts at cities like Newark, N. J., or Denver, Colo.

The amount of mail involved for daily transmission for the five branches just mentioned (excluding the general post-office) is as follows:

First-class pieces collected daily.....	297,825
First-class pieces from drop daily.....	428,895
First-class pieces delivered daily.....	512,605
Special-delivery pieces delivered during the last fiscal year.....	175,902

PROPOSED EXTENSION OF TUBE.

The extension of the pneumatic-tube service, which is deemed advisable in the near future, would comprise city territory as far north as One hundred and twenty-fifth street, about $7\frac{1}{2}$ miles north of the general post-office; this including as the northernmost points branch post-offices J and L, both of which are situated on One hundred and twenty-fifth street.

The distance between each of the branches both by ordinary wagon route and by pneumatic tube, together with the frequency of trips and the relative speed in transmission, are shown by the following tables:

Table of distance and comparative speed.

From—	To—	Distance by wagon or car.	Time in transit and speed.								Distance by pneumatic tube.
			By wagon.		By street car.		By elevated railroad.		By tube. ^a		
			Time.	Per hour.	Time.	Per hour.	Time.	Per hour.	Time.	Per hour.	
		Miles.	Min.	Miles.	Min.	Miles.	Min.	Miles.	Min.	Miles.	Miles.
General post-office	S	0.63	7	5.40					1.34	29	0.76
Do	V	.76	8	5.70			13	3.51	1.34	29	.76
V	A	.50	12	2.50					1.02	29	.50
A	O								2.22	29	1.15
O	C	.96	10	5.76					1.59	29	.96
C	Foreign branch	.52	9	3.47					1.04	29	.52
General post-office	do	1.58	18	5.27					8.03	29	3.89
O	E	.87					35	1.50	1.48	29	.87
E	H								2.30	29	1.21
H	G	.95	15	3.80					1.39	29	.80
E	G	1.09	11	5.94			26	2.51	4.09	29	2.01
G	N	1.12	14	4.23			24	2.80	1.19	29	1.12
N	W	.80					25	1.92	1.39	29	.80
W	I	1.35					22	3.59	2.47	29	1.35
I	J	1.61					26	3.72	3.20	29	1.61
J	L	.64			11	3.49			1.19	29	.64
L	U	1.21	12	6.05			22	3.30	2.30	29	1.21
U	K	.84	9	5.60			19	2.65	1.44	29	.84
K	Y	.93	12	4.65			14	3.99	1.55	29	.93
Y	H	1.31	15	5.24			23	3.42	2.43	29	1.31

^a Calculated on speed of existing tube which averages 29 miles per hour.

The Tubular Dispatch Company estimate that the proposed extension of the tube will call for 36.04 miles of single tube. This, added to the present tube, which excluding the Brooklyn circuit, is said by the company to be 10.58 miles, makes a total of 46.62 miles of single tube, or 23.31 miles of double tube.

Table of frequency of service.

From—	To—	Distance by wagon or car.	By wagon, daily trips.		By street car, daily trips.		By elevated railroad, daily trips.		By tube, daily trips. ^a		Distance by pneumatic tube.
			Week days.	Sundays.	Week days.	Sundays.	Week days.	Sundays.	Week days.	Sundays.	
		Miles.									Miles.
General post-office	S	0.63	31	8					35	11	0.76
Do	V	.76	36	7				32	4		.76
V	A	.50	28								.50
A	O										1.15
O	C	.96	29								.96
C	Foreign branch	.52	31	7							.52
General post-office	do	1.58	36	8					35	11	3.89
O	E	.87					32	1	35	11	.87
E	H								35	11	1.21
H	G	.95	31						35	11	.80
E	G	1.09	20	5			32	1	35	11	2.01
G	N	1.12	2	2			32	5	35	11	1.12
N	W	.80					33	5	35	11	.80
W	I	1.35					33	5	35	11	1.35
I	J	1.61					33	5	35	11	1.61
J	L	.64			34	5			35	11	.64
L	U	1.21	5	1			34	6	35	11	1.21
U	K	.84	5	1			34	6	35	11	.84
K	Y	.93	6	2			34	6	35	11	.93
Y	H	1.31	6	2			34	6	35	11	1.31

^a Estimated on basis of existing tube. Additional trips are made whenever matter is ready for dispatch.

Upon examination it will be perceived that this proposition includes fifteen branch post-offices of the New York post-office, as follows: Branches A, C, E, G, I, J, K, L, N, O, S, U, V, W, and Y.

The importance of these branch post-offices is displayed in the following statement, which shows the postal receipts, the first-class matter posted at each branch daily, both from collections and drops, the number of deliveries and first-class pieces delivered daily, and the number of pieces of special-delivery matter delivered:

Table of receipts and mail handled at branches.

General post-office or branch.	Postal receipts for year ended June 30, 1900.	Number of collections.		First-class pieces collected daily.	First-class pieces from drop daily.	Number of deliveries.		First-class pieces delivered daily.	Special-delivery pieces delivered year ended June 30, 1900.
		Week days.	Sun-days.			Week days.	Sun-days.		
General post-office .	\$3,998,378.68	27	4	354,329	386,820	9	—	720,464	144,584
A	293,288.87	24	4	100,000	93,000	10	—	113,000	21,784
C	114,166.70	16	6	24,215	20,266	13	—	24,426	15,412
E	400,870.90	28	10	74,263	87,694	8	—	78,262	101,721
G	178,722.22	15	6	44,501	16,597	7	—	67,062	49,335
H	525,180.27	a 24	6	30,100	41,280	8	—	76,659	42,451
I	89,365.95	16	5	14,846	9,331	6	—	32,500	29,060
J	139,272.75	14	5	17,136	15,810	6	—	38,954	38,066
K	109,559.88	16	5	12,272	9,312	6	—	22,183	17,942
L	118,025.80	14	5	20,129	29,965	6	—	23,309	12,916
N	73,050.60	16	5	29,937	6,550	6	—	31,813	25,010
O	607,502.07	24	6	102,000	171,000	8	—	192,000	59,126
S	329,659.29	24	4	45,257	39,926	8	—	83,380	23,127
U	58,250.00	16	5	15,359	16,029	6	—	19,812	12,466
V	195,027.73	28	4	52,944	40,219	10	—	51,373	11,542
W	95,316.05	16	5	12,294	7,754	6	—	31,000	37,613
Y	107,318.26	16	5	21,000	13,000	6	—	36,067	25,077

a Eight of these collections cover only a part of Branch H district.

It will be seen from this statement that the gross receipts from these fifteen branches amounted to \$2,909,397.07, this being equal to 31.1 per cent of the total receipts of the New York post-office and its branches. If we add these figures to the gross receipts of the five branches already connected by pneumatic tube we find an aggregate of 54 per cent of the total receipts, and if to this we add the receipts of the general post-office, \$3,998,378.68, or 42.7 per cent of the total receipts, we find that the aggregate postal receipts of the general post-office and all branches which would be included in the proposed pneumatic-tube service would represent 96.7 per cent of the total receipts from the New York post-office.

Hence it will be seen that the revenues from the branch post-offices farther north than One hundred and twenty-fifth street, and also including Branch B on the lower east side (the only down-town branch omitted from the proposed extension of the tube service), represent comparatively a small proportion of the total receipts—a little over 3 per cent.

It should be observed when contemplating the postal receipts from these twenty branches of the New York post-office that they represent an average for each branch of \$257,585 per annum, this sum exceeding the receipts reported a year ago at post-offices such as New Haven, Conn., Hartford, Conn., Syracuse, N. Y., and Richmond, Va.

VOLUME OF MAIL TO BE TRANSMITTED.

The amount of first-class mail posted on each of the postal districts, as well as the amount delivered, is shown in the above table. The

aggregate amount of first-class mail collected daily is 1,238,307 pieces. The amount of first-class mail posted at the general post-office and branches (drop mail) is 1,392,168 pieces daily, or a total of first-class matter mailed daily of 2,630,475 pieces. Of this amount it will be noticed that about 49 per cent is collection mail and about 51 per cent drop mail.

The aggregate amount of mail delivered to the public at the general post-office and branches daily is 2,078,210 pieces.

The special-delivery pieces delivered at the general post-office and branches (included in the pneumatic-tube district) during the year ended June 30, 1900, was 800,683, or 94 per cent of all special-delivery pieces delivered in the city. The total number of special-delivery pieces delivered throughout the city was 849,461; and of these, 320,134 were of local origin, viz, mailed in the city, this being 37.7 per cent of the whole.

The above statistics disclose a condition of very great importance. It shows an amount of local service not equaled, and perhaps not even approached, by any other post-office in the country.

One very important point which must not be overlooked is the great proportion of drop mail—51 per cent—which would be especially advanced by the pneumatic-tube service, because of its being mailed directly at the post-office or at some one of the branches.

POSSIBLE ECONOMIES.

With the pneumatic tube extended as above proposed there would undoubtedly be great opportunities for curtailing the existing service. The wagon service associated with the local interchanges between the general post-office and branch post-offices is performed at the contract price of \$117,400 per annum. This price was fixed about four years ago, and the new contract about to be made will doubtless show a proportionate increase.

We have already noticed that the wagon service between the general post-office and branch post-offices has been reduced 62 per cent, and there are officials competent to form an opinion on this subject who believe that with the proposed extension of the tube service the local wagon service can be reduced from 65 per cent to 75 per cent. Let us, however, take a conservative estimate of 50 per cent, and we find a saving of \$58,700 per annum.

As confirming this estimate a count was made for one day, to establish the weight of city paper mail dispatched from the general post-office and branches, and it was found to reach a total of 88,000 pounds, or 44 tons. This weight, if we allow about 680 pounds to a small wagon, would require 130 wagon trips daily for its transmission.

The existing local service now shows 839 wagon trips, without including 1,785 trips made by foot messengers or messengers with handcars. It will therefore be seen that on the basis of weight carried, and not of frequency, the present number of wagon trips for city service can be materially reduced if the first-class mail is transmitted through the tube.

In addition to this saving there would be additional items of service which could be cut off, as, for example, the mail transportation on the elevated railroads, \$10,000 per annum; the messenger service between the branch post-offices and the elevated railway stations, estimated to

cost about \$26,000; the messengers who travel on the elevated railway trains in custody of the mails, about \$6,000 per annum; and the street-car service between branches J and L, about \$500 per annum; these items making a total of \$42,500 per annum. Adding this sum, \$42,500, to the saving in wagon service just calculated above, \$58,700, we find a total possible economy of about \$100,000 per annum.

SIZE OF TUBE FOR PRESENT AND PROSPECTIVE USE.

Adhering to the opinion that the proper function of the pneumatic tube, under existing conditions, is for the transmission of first-class mail mainly, it is believed that the present diameter, 8 inches, is large enough for the present needs of the service, and also for the prospective demands of the service for a reasonable period.

A special count was recently taken for four days, October 6 to 9, 1900, of the first-class mail passing from the general post-office to Branch P. The count showed a total of 200,850 pieces, of which only 3 pieces were too large to be transmitted through the 8-inch tube.

NECESSITY OF THE PROPOSED SERVICE.

The necessity for the proposed service is considered to be evident from the foregoing testimony regarding the immense amount of important first-class matter requiring daily transmission through the city, coupled with the fact that the pneumatic tube provides a speed of transmission of about 30 miles per hour, in contrast with the present speed on surface lines of 6 miles an hour or less.

This gain is much more apparent in widely separated centers than it is for adjoining districts, although, even in the last mentioned cases, it is too important a gain to forego.

The present time of transmission from the general post-office to Branch J, via the elevated-railroad service, where a speed of 12 miles an hour is available, is fifty-three minutes. The time by the tube would be about seventeen minutes.

Another appropriate instance to cite would be the transmission of mail in the greater city, including Brooklyn, taking widely separated centers, such as Branch J in the borough of Manhattan, and Branch B in the borough of Brooklyn, a distance of 12.39 miles. The intervening territory between these points is all thickly settled. The time of transmission otherwise than by pneumatic tube is as follows:

	Minutes.
Branch J to New York general post-office.....	53
New York general post-office to Brooklyn general post-office	27
Brooklyn general post-office to Branch B.....	19
Total	99

The time by the tube would be as follows:

	Minutes.
Branch J to New York general post-office.....	17
New York general post-office to Brooklyn general post-office	3
Brooklyn general post-office to Branch B.....	6
Total	26

Here we find a gain of sixty-three minutes, over one hour, in transmission.

Cases could be cited at the present time where it is impracticable for a person to mail a letter in a street letter box in the morning and

receive a return reply the same day in the thickly settled limits of the greater city.

The pneumatic-tube service is regarded as essential to improve this regrettable condition, because there is no other apparent means by which the time in transmission can be reduced.

It is found that every step that has been taken to accelerate the transmission and delivery of local first-class mail has been immensely profitable to the Department. This class of mail is exempt from the charge for domestic transportation, which takes up about 55 per cent of the entire postal revenues, and is therefore very profitable to the postal service. It is calculated that on the basis of 40 per cent of all first-class matter originating in New York being for local delivery (and this percentage is well verified by frequent tests), there is a profit to the Government from first-class matter in New York City of local origin and for local delivery of nearly \$1,300,000 per annum.

Any additional steps that are taken to increase the facilities by means of pneumatic tubes for the transmission of mail, and of increased collections and deliveries, must not only be of great assistance to local commerce, but also render a large profit to the Government to sustain the postal service in Western and Southern parts of the country where it is performed at a great loss on account of the distances to be traversed.

POSSIBLE USE OF SINGLE TUBES AS FEEDERS.

The possibility of using single lines of tubes, or tubes of smaller diameter than 8 inches, as feeders to the main lines has received some consideration; but the conclusion is that it is somewhat premature to enter into this field definitely.

There is no doubt, however, that if the main lines of pneumatic tube are extended, there will be a development in the natural order of things in the direction suggested. The great business buildings may desire direct connection with the general post-office or with the branches by means of pneumatic tubes; and it may also be advisable to use similar tubes for subsidiary branch post-office stations to facilitate the delivery of special-delivery letters and to increase the growth of this profitable class of business.

SPECIAL POSTAGE RATES.

The feasibility of recommending extra postage rates for mail that is sent through the pneumatic tube has also been carefully considered, but it does not seem to be a question regarding which any positive ground can be taken at the present time.

The practice of charging an extra rate in France and Germany for pneumatic-tube mail is in conjunction with a small 3-inch tube which is used only for the transmission of telegrams or of special-delivery matter. The present tubes used in this country, 8 inches in diameter, allow of the transmission of all first-class matter, and the profit that should be derived from the increased local mail will doubtless be a sufficient reason for affording the pneumatic-tube service to the public without extra charge, if the tube service can be obtained at a reasonable rate.

It is believed, however, that this point of additional postage should be kept in mind, to regulate the amount of matter for transmission through the tube; and in fact an extra charge might be justifiable on all matter dispatched in supplementary closes to railway trains by

means of the pneumatic tube. At the present time we would not recommend any additional postage rate for pneumatic-tube transmission on first-class matter, either of local or domestic origin, for local delivery.

SPACE AT THE GENERAL POST-OFFICE AND AT BRANCH POST-OFFICE STATIONS.

A list is appended showing the situation as regards room for additional pneumatic-tube plants and tubing at the general post-office and at the several branches:

Location.	Additional machines.		How to be provided for. Remarks.
	No.	Space.	
General post-office	1	Limited	Rearrangement of present machines.
Branch A	1	do	Rearrange furniture. Basement privilege necessary.
Branch C	1	do	Do.
Branch E	<i>a</i> All	Ample	Space in basement necessary.
Branch G	1	Limited	Rearrange furniture. Basement privilege necessary.
Branch H	3	Ample	Rearrangement of furniture.
Branch I	1	do	Do.
Branch J		None	Extra room would be required.
Branch K		do	Do.
Branch L	All	Ample	Space in basement necessary.
Branch N	1	Limited	Rearrange furniture. Basement privilege necessary.
Branch O	All	Ample	Do.
Branch S	All	do	Ample space available.
Branch U	All	do	Relay station. Basement space necessary.
Branch V		None	Extra room would be required.
Branch W	All	Ample	Relay station. Basement space necessary.
Branch Y		None	Extra room would be required.
Foreign branch	All	Ample	Ample space available.

a All necessary machines can be accommodated.

It will be observed that extra room would be required at four branches, viz, J, K, V, and Y; and that it would be necessary to secure space in the basement at four stations, viz, E, L, U, and W. It would also be necessary to secure the privilege of having the tubes pass through the basement at five stations, viz, A, C, G, N, and O.

The cost of this additional space, which could be attributed as an expense to the pneumatic-tube service, is comparatively small.

Each pneumatic-tube machine occupies a space 23 feet 6 inches by 3 feet 6 inches, and in addition there is required room about three times the width of the machine adjoining, for operating the same.

In certain branch post-offices where there is not at present sufficient spare space in the present quarters, it is already necessary for additional space to be secured for general postal purposes; as for example, at branches J and K, where the postal service is now cramped, and where it is advisable that a change in location be secured, without special regard to the pneumatic-tube service.

The same point would apply to other branch post-offices.

In conjunction with new leases, the necessities of the pneumatic-tube service could be especially covered, in some cases at a nominal figure; whereas a special request for terms, without regard to a new lease, might bring out extortionate demands.

MOST ECONOMICAL AND PRACTICABLE SYSTEM OF INSTALLATION AND MAINTENANCE.

In regard to this phase of the matter, no competing companies have approached the subcommittee, nor are we aware of the existence of any. Further, in the absence of expert testimony, we have no means

of gauging the fairness of the annual cost of the existing service in comparison with the cost of installation and maintenance. The local committee here invited the Tubular Dispatch Company to submit a statement as to the cost of installation and maintenance of the extended system of tubes herein proposed, and in reply was informed that the Tubular Dispatch Company had submitted a statement to the Postmaster-General on October 8 instant, and they assumed from the fact that the request was made by the Postmaster-General that he intended to furnish the subcommittee with this information subsequently.

CONCLUSION.

Our conclusion is therefore that the local mail service in the city of New York is in need of this method of quick transmission; that the importance of the city and its business fully warrants the extension, and that the result will be profitable to the Post-Office Department, provided the pneumatic-tube service is performed at a reasonable rate per annum.

The further question as to what is a fair rate, and the important question as to whether the service should be performed by contract or by the Post-Office Department acquiring the plant, patents, and franchises of the existing companies, must be left to the recommendation of the joint committee, after expert testimony has been obtained, and the estimate of the Tubular Dispatch Company has been verified.

C. VAN COTT,

Postmaster, New York, N. Y.

V. J. BRADLEY,

Superintendent Railway Mail Service, Second Division.

NEW YORK, *November 12, 1900.*

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The report of the local committee has been considered by the joint committee appointed under the Postmaster-General's Order 989, and after careful examination its facts and conclusions are accepted and recommended for the favorable consideration of the Department, it being noted that the recommendation for an extension of 18 miles of pneumatic-tube service is based upon the condition that the service shall be obtained at a reasonable rate.

The joint committee has conferred with the Tubular Dispatch Company at New York, and has received its estimate as to the cost of construction and the cost of operating the proposed extension, the estimate being the same as that submitted by the company in formal letter to the Postmaster-General dated October 8. The Tubular Dispatch Company estimates the cost of constructing the 18 miles additional at \$925,500. These figures are stated as not including the cost of any franchises or patent, but simply labor, material, and expense that would be incurred in the actual building of the line, provided the company obtained the necessary legal authority and consent for such work, and regarding this the company anticipates no difficulty. It is our understanding that the company expressly waives any charge for the use of its franchise or patents in this connection.

The Tubular Dispatch Company proposes to enter into a five-year contract with the United States Government, duly authorized by Congress, to transport mail within the capacity of their tubes for the complete system, new and old, for the annual consideration of \$398,500. It points out that while the charge, including all power, is only 238 per cent of the present rental, and 54 per cent of the present charge per mile, including power, the carriers for the new extensions will be made 30 inches in length instead of 24 inches, outside length, thus furnishing a carrying capacity 25 per cent greater than the carriers of the present system.

The Tubular Dispatch Company concludes, under advice of its legal counsel, that it has not the right to dispose of its franchise for mail-carrying purposes alone, and that any proposition for disposing of its franchise for carrying commercial matter as well as mail matter would first have to be approved by the stockholders and bondholders, and subsequently require authority from the State legislature.

We have therefore confined our attention particularly to the proposition of the company to operate the new system of pneumatic tubes, together with the existing system, thus connecting 21 branches of the New York post-office and the general post-office with 8-inch tubes, for the aggregate annual pay of \$398,500.

We must first observe, in contemplating this proposition, that it covers all expenses of operation, relieving the Treasury Department, or the Post-Office Department, from any expense for power, and virtually provides a complete system of transmission for first-class mail, and also to an incidental extent for mail of other classes, without any additional expense beyond the sum just named, unless it should be for rental of additional space in the branch post-offices, or in the basements of the same, for the pneumatic-tube machinery, or to allow of entrance for the tubes.

In regard to this feature, it is impracticable to obtain definite figures at the present time as to what this expense would be. The space required where steam power is used would be about 24 feet in length by about 10 feet in width, this including space for the operators; but if electric power is used, the space might be stated roughly as half that amount. In those branch post-offices where it would be impossible to locate the machines in the space now rented, it appears that a change of location is desirable, because the branch post-offices are already overcrowded, and it is quite likely that when the new leases are effected the additional space required for the pneumatic-tube machinery will not make a noticeable addition to the rental.

The question as to whether the proposed charge of \$398,500 represents a reasonable rate is one to be tested by engineering experts. The Tubular Dispatch Company informed us that they have the detailed figures, and are entirely willing to submit them to such board of experts as the Department may appoint for verification, simply desiring that the figures be not published for the information of possible rival companies. In alluding to the rate (\$398,500), Mr. Bogardus, the general manager of the company, assured your committee that it represented the lowest possible rate for which a responsible company could operate the new and old service, as he also claimed that the cost of the new construction, \$925,500, represents the lowest possible cost for economical construction. He said, in response to a question, that the figures were prepared on the basis of absolute cost, plus less than

10 per cent interest on the cost of construction, this also including provision for the renewal of the system, which is not calculated to last over twenty years.

The annual charge of \$398,500 is analyzed by Mr. Bogardus as including \$136,000, more than which he says will be expended by the company in supplying power, this including the pay of engineers, firemen, etc.; also as including \$60,000, which is said to be approximately the aggregate wages of station operators, and also including \$18,000 as local taxes to the city of New York. This makes a total of \$214,000 for power, labor, and taxes.

Deducting these analyzed items, \$214,000, from the total annual charge, \$398,500, we find a balance of \$184,500 per annum which must cover the interest on the cost of construction of both the old and new system, provision for renewal and repairs and the expenses of supervision, inspection, and the administration of the company.

Your committee therefore transmits the detailed figures submitted by the Tubular Dispatch Company for examination and verification by a board of experts to be appointed by the Department and, without expressing at this time any opinion regarding the acceptability of the estimate, we have nevertheless considered whether the expenditure of an annual sum of \$398,500 for the improvement of the local mail service in New York City would be justified.

We first note that the annual cost of the present service of 5.18 miles of tube (4.20 miles recognized by the Department) is \$158,500 per annum. To this should be added the cost of power paid for by the Treasury Department, estimated at \$8,600, making a total cost of \$167,100 per annum, or at the rate of \$33,420 per mile. In contrast with this we find the proposed annual cost of the old and new service to be \$398,500 for 23 miles of double tube, or at the rate of \$17,326 per mile; this being, as the company has said, only 54 per cent of the present rate.

We have next considered what economies would be feasible if the proposed extension were authorized by the Department, thus rendering unnecessary any substantial frequency in wagon service other than what was required by the quantity of mail to be dispatched, based on the wagon load. The following items of saving are estimated or calculated, and are regarded as moderate:

1. Reduction in city wagon service, 50 per cent, equal to.....	\$58,700
2. Discontinuance of elevated railroad service, except two trips each way daily to One hundred and fifty-fifth street.....	9,000
3. Discontinuance of side messenger service to the elevated stations.....	26,000
4. Discontinuance of closed pouch service between Branches J and L.....	500
5. Discontinuance of messengers on elevated trains.....	5,652
6. Estimated saving on wagon service to new foreign branch.....	1,200
Total.....	101,052

In addition to the economies which were thought possible, your committee has also given consideration to the question of possible increased revenue to the Post-Office Department by means of the pneumatic tube; and in this regard attention is naturally directed to the special-delivery service.

We recommend that the Department consider the propriety of reducing the delivery pay of special-delivery messengers from 8 cents per piece to 5 cents per piece in postal districts wherein pneumatic-tube service is in operation. This, we believe, can be done by order

of the Postmaster-General, slightly altering the regulations, without the necessity of new legislation. The object of the recommendation is to secure additional revenue in places where the number of special-delivery pieces is now large and promises to become greatly increased because of the facilities of pneumatic-tube service, the result being that the special-delivery messengers will have more letters to deliver per trip, and should without very much additional effort earn the same or greater compensation than at present, the maximum being now fixed by law at \$30 per month, which maximum should be raised or removed by new legislation.

In New York City during the last fiscal year there were delivered on the 21 postal districts which it is contemplated to connect by pneumatic tube 800,000 special-delivery pieces. If the pay for delivery on these was reduced from 8 to 5 cents, there would be an additional revenue to the Department of 3 cents per piece, or \$24,000 per annum.

It is also important to observe that at New York the special-delivery mail of local origin is very heavy, being about 37.7 per cent of the whole. During the last fiscal year there were 320,000 special-delivery pieces of local origin. If we assume that the pneumatic-tube service would double this business within a year, and this we do not regard as an extravagant estimate, there would be a gain through the reduced delivery expense of about 5 cents per piece, or \$16,000 per annum.

There are other savings in connection with the pneumatic-tube service which are very difficult to measure. It is believed that the greater frequency of dispatch will reduce the maximum amount of mail at certain periods of the day, and since this maximum has been the gauge for the employment of clerical labor, it seems certain that the future requisitions of the New York post-office for additional clerical labor should be reduced to some extent by this change in the conditions. This saving we can not measure at all, but making a very low estimate of 5 per cent, we venture to assume that there would be a theoretical saving of about \$15,000 per annum in this way, and it is possible that the saving would be much greater.

If we join these additional items, which aggregate \$55,000, to the savings in transportation already referred to, \$101,052, we find a total of \$156,052.

Comparing this with the cost of the extended service for the 16 branch stations, including the foreign branch, \$231,400, we find a remaining charge of \$75,348, which we regard as approximately the net additional charge for the pneumatic-tube extension.

We have not alluded to the natural increase in ordinary first-class city matter, which is believed to follow close upon any improvements in the service, and which should certainly be very noticeable in response to what may be termed a revolutionary improvement in the service, thus producing additional revenue.

Nor have we alluded particularly to the fact that the extensions of the pneumatic-tube service, providing mechanically for great frequency in intercommunication between the branches, should relieve the Department of the usual percentage of increase in the cost of mail-wagon service at the quadrennial lettings.

It is also possible that the improved facilities may so popularize the local special-delivery service as to avoid the necessity of unduly increasing the ordinary carrier deliveries; and if this proves to be true, there would be a noticeable indirect saving to the Department.

In contemplating the possibility of this additional charge of \$75,348 per annum against the local transportation service in New York City, it becomes interesting to know the relative cost at present of city mail transportation.

We find that on July 1, 1900, the cost of free-delivery service (letter carriers' salaries) in New York was \$1,434,800; and if we assume that 40 per cent of this is applicable to the mail of city origin we would find this sum to be \$573,920. We also find the expense of clerk hire, omitting money-order department, in the New York post-office on July 1 was \$1,795,200, 40 per cent of which, estimated as applicable to the mail of city origin, would be \$718,080. The cost of city transportation service, including the present pneumatic-tube system, is calculated to be \$344,585.

We therefore find the expenses incident to the city mail service to be as follows:

	Per cent.
Free-delivery service	\$573,920=35
Clerk hire	718,080=44
City transportation	344,585=21

We seem therefore justified in concluding that the present cost of city transportation is extremely moderate in relation to other expenses, being only 21 per cent of the total expense for transporting, sorting, and delivering the city mail; whereas in the United States, as a whole, the cost of mail transportation represents over 50 per cent of the total expenditures.

If we add to the cost of city transportation \$344,585, the sum we estimate to be the net additional charge for increased pneumatic-tube service, \$75,348, we reach a total for city transportation of mails of \$419,933. This aggregate would still be very far below either of the other items, viz, free-delivery service and clerk hire.

Another instructive reflection arises from comparing the additional net charge of \$75,348 with the total revenue to the Post-Office Department from the local first-class mail in New York City, which the local committee estimated to be \$1,300,000 per annum. It represents an expenditure of less than 6 per cent of the net annual revenue from the local first-class mail.

We therefore conclude that if it be found upon examination that the proposed annual cost of operating the entire pneumatic-mail service (new and old) is economically stated by the Tubular Dispatch Company in its figures of \$398,500 per annum, the Department would be justified in recommending to Congress the appropriation of that amount to provide this additional and important facility for the greatest city of the United States.

C. VAN COTT,
Postmaster,

V. J. BRADLEY,
Superintendent Railway Mail Service,
Local Committee.

J. M. MASTEN,
E. W. ALEXANDER,
General Committee.

TUBULAR DISPATCH COMPANY,
New York, November 13, 1900.

V. J. BRADLEY, Esq.,
Member of Local Committee, Pneumatic Tube Investigation.

SIR: Complying with your verbal request, I have already handed to Chairman Masten copies of our letters and propositions to the Government embodied in a letter under date of October 8, 1900, addressed to the Hon. Ch. Emory Smith, Postmaster-General, and I also hand you details of data, viz:

(A) Estimates on the cost of installing the tubes in the streets of the borough of Manhattan in the city of New York, connecting all those stations which are not already connected by pneumatic tubes, with the exception of stations B and M, said estimate being addressed to me under date of September 4 and signed by Lloyd Collis, chief engineer.

(B) Estimates on the cost of installation of the tube stations in the New York post-office and branch stations, including all work inside of the building lines, all machinery, except switches, and all power stations. And also the cost of operating said lines. The lines included in this estimate being the extensions only, and all stations being additional to those stations now in operation.

(C) A recapitulation of the cost of construction.

(D) A statement of the cost of operation, showing the method and detail of arriving at the proposed rental.

In handing you these estimates I desire to confirm offers made to the honorable Postmaster-General, coupled with an urgent request that all these estimates and figures be carefully investigated by your committee, assisted by competent engineers versed in the design and construction of machinery and the laying of pipes in the streets and tunnels in this city.

Yours, respectfully,

W. A. H. BOGARDUS,
Vice-President and General Manager.

A.

NEW YORK, September 4, 1900

W. A. H. BOGARDUS, Esq.,
Vice-President and General Manager.

SIR: I beg to submit the following estimates on the cost of installing the tubes in the streets of the borough of Manhattan, in the city of New York, connecting all those stations which are not already connected by pneumatic tubes, with the exception of Stations B, 380 Grand street, and M, 1965 Amsterdam avenue, between One hundred and fifty-seventh and One hundred and fifth-eighth streets:

- First. Connecting station S in the down-town line of the present circuit No. 2.
- Second. The west side 8-inch tube from general post-office to Station H via Stations V, A, O, and E, hereafter designated as circuit No. 4.
- Third. An 8-inch tube from Station O to the new foreign station at the southeast corner of Morton and West streets via Station C, hereafter designated as circuit No. 5.
- Fourth. An 8-inch tube from Station H, connecting Stations H, G, N, I, and J.
- Fifth. An 8-inch tube connecting Stations H, Y, K, U, L, and J.

These estimates are based upon the best available prices obtainable at the present time as far as material is concerned. As for labor, the prices are the same as were paid to Naughton & Dalton when they laid the present system for the Tubular Dispatch Company.

172,307 feet of cast-iron pipe, bored 8½ inches, at \$1.50 per foot.....	\$258,460.50
50,749.40 cubic yards excavation, at 50 cents per yard.....	25,374.70
Granite block paving on concrete foundation at \$4 per yard, asphalt paving varying from \$2.70 to \$5 per square yard, cut in order to lay the tubes	120,065.99
Laying tube, including brass bands and appurtenances, 173,711 feet at 55 cents per foot; this price includes the cartage on work, lowering the tube into the trench, yarning and leading joints	95,541.06
Brass bends, 96 right-angle bends at \$250 each, 10 bends of less than 90 degrees at \$200 each	26,000.00
Reducers, 212 at \$13.75 each	2,915.00
Dutchmen, 165 at \$40 each.....	6,600.00
Drip pots, 167 at \$20 each.....	3,340.00
Standpipe boxes, 539 at \$5 each	2,695.00

Switch manholes, 18 at \$579.50 each	\$10,431.00
Iron-pipe connections, 3,474 feet, at 5 cents per foot	173.70
Bricking standpipes, 555 at \$6.25 each	3,468.75
Switches with bends, 9 at \$1,777.50 each	15,997.50
Penetrating walls	1,300.00
Bricking brass bends, 106 at \$30 per bend	3,180.00
Rock excavation	9,000.00
Additional cost of laying tube on bridge work at Forty-fifth street, 1,344 feet at \$1.50 per foot	2,016.00
Plans, preliminary works, profile, collecting data	5,969.31
Engineer inspection during construction	10,000.00
Drip-pot manholes, 83 at \$270.05 each	22,414.15
	<hr/>
	624,942.66

Respectfully submitted.

LLOYD COLLIS, *Chief Engineer.*

B.

NEW YORK, August 20, 1900.

W. A. H. BOGARDUS, Esq.,
Vice-President and General Manager.

SIR: I beg to submit the following estimates on the cost of installation of the tube stations in the New York post-office and branch stations, including all work inside of the building line, all machinery except switches, and all power stations, and also the cost of operating the lines, as follows:

First. Connecting Station S in the down line of the present circuit No. 2.

Second. A west-side 8-inch tube line from general post-office to Station H, via Stations V, A, O, and E, hereafter designated as circuit No. 4.

Third. An 8-inch tube line from Station O to the new foreign branch, via Station C, designated hereafter as circuit No. 5.

Fourth. An 8-inch tube line from Station H connecting all the west-side and east-side stations from Forty-fourth street to One hundred and twenty-fifth street, inclusive, and terminating at Station H, which will be designated hereafter as circuits Nos. 6 and 7.

The estimates are based on the best data and prices available at the present time. I have assumed that the post-office will provide sufficient room for the installation and operation of the tubes and machinery, also basement room under the recent Thirty-first street addition to Station E for switches, and sufficient basement room at Stations W, J, and U for our power stations.

Circuit No. 2.—Adding Station S to down line single intermediate station.

CONSTRUCTION.

1 intermediate machine	\$3,000.00
3 long bends	450.00
2 reducers	30.00
7 lengths cast-iron pipe	126.00
Strengthening floor	100.00
Labor—erecting, testing, etc	600.00
Auxiliary 2-inch pressure piping to Centre street	325.00
Lockers, tools, etc	50.00
	<hr/>
	\$4,681.00

OPERATION,

	Per year.
2 operators at \$2 per day	\$1,360.00
Extra power required at Madison Square	600.00
Oil, waste, etc	40.00
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Total extra cost per year of operating circuit No. 2 on account of Station S

2,000.00

Circuit No. 4.—Connecting general post-office with stations V, A, O, E, and H.

CONSTRUCTION.

General post-office—Terminal station (single):	
1 open receiver and dispatcher.....	\$2,000.00
2 long bends.....	300.00
7 short bends.....	875.00
300 feet cast-iron tubing.....	450.00
Moving general post-office, 2 machines.....	375.00
Labor—Erecting, testing, etc.....	700.00
Lockers and tools.....	50.00
Station V—Intermediate station (single):	\$4,750.00
About same as Station A.....	4,735.00
Station A—Intermediate station (single):	
1 intermediate machine.....	3,000.00
2 long bends.....	300.00
5 short bends.....	625.00
80 feet cast-iron tubing.....	120.00
6 reducers.....	90.00
Strengthening floor.....	100.00
Labor—erecting, testing, etc.....	450.00
Lockers, tools, etc.....	50.00
Station O—Terminal station (double):	4,735.00
2 open receivers and dispatchers.....	4,000.00
6 short bends.....	750.00
560-feet cast-iron tubing.....	840.00
4 reducers.....	60.00
Labor—erecting, testing, etc.....	850.00
Tools, lockers, etc.....	50.00
Station E—Intermediate station (double):	6,550.00
2 intermediates.....	6,000.00
12 short bends.....	1,500.00
350-feet cast-iron tubing.....	525.00
8 reducers.....	120.00
2 sets switches.....	3,000.00
Foundation switches.....	250.00
Labor—erecting, testing, etc.....	1,150.00
Tools, lockers, etc.....	50.00
Station H—Terminal station (single):	12,595.00
1 open receiver and dispatcher.....	2,000.00
3 bends.....	375.00
36 feet cast-iron tubing.....	48.00
2 reducers.....	30.00
Labor—erecting, testing, etc.....	400.00
Air piping to power house.....	2,400.00
Lockers, tools, etc.....	50.00
Addition to power plant, Station H:	5,303.00
1 duplex compressor.....	3,750.00
Air and steam piping.....	1,750.00
Addition to power plant at general post-office:	5,500.00
1 duplex compressor.....	3,750.00
Steam and air piping.....	3,400.00
Foundation.....	1,250.00
Power plant at Station O:	8,400.00
2 125-horsepower boilers.....	3,250.00
3 compressors.....	11,250.00
3 foundations.....	3,600.00
Steam and air piping.....	4,400.00
Setting 2 boilers.....	1,100.00
General:	23,600.00
400 carriers.....	8,000.00
Total.....	84,168.00

Summary—Construction—Circuit No. 4.

STATIONS.	
General post-office, 3	\$4, 750. 00
Station V	4, 735. 00
Station A	4, 735. 00
Station O	6, 550. 00
Station E	12, 595. 00
Station H	5, 303. 00
	<u>\$38, 668. 00</u>

POWER PLANTS IN ADDITION TO PRESENT EQUIPMENT.

Power house A	\$5, 500. 00
General post-office	8, 400. 00
Station O	23, 600. 00
	<u>37, 500. 00</u>

GENERAL.	
Carriers	8, 000. 00
Total	<u>84, 168. 00</u>

Operation; Circuit No. 4.

LABOR.		Per year.
General post-office, 3: 2 men, at \$1.90; 2 men, at \$1.70		\$2, 448. 00
Station V: 2 men, at \$2		1, 360. 00
Station A: 2 men, at \$2		1, 360. 00
Station O: 2 men, at \$1.90; 4 boys, at \$1.00		2, 652. 00
Station E: 2 men, at \$2.00; 2 men, at \$1.80		2, 584. 00
Station H: 2 men, at \$1.90; 2 men, at \$1.70		2, 448. 00
		<u>\$12, 852. 00</u>

POWER.	
General post-office, 72 horsepower	7, 029. 50
1 additional oiler	730. 00
Power House A, 60 horsepower	7, 322. 40
Station O, 132 horsepower	16, 109. 28
	<u>31, 191. 18</u>

GENERAL.	
Oil, waste, etc.	220. 00
Repairs, and wear and tear on carriers	7, 000. 00
Inspectors and linemen	2, 380. 00
Telephone service	1, 300. 00
Petty expenses, maintenance machines	650. 00
	<u>11, 550. 00</u>
Total operation, expenses per year	<u>55, 593. 18</u>

The item "repairs, and wear and tear on carriers" includes:

Repacking 400 carriers	\$1, 600. 00
Wear and tear on carriers	3, 000. 00
Repairing carriers	1, 200. 00
Rent on extra shop room needed and power	1, 200. 00
	<u>7, 000. 00</u>

The item "inspectors and linemen" includes:

Inspectors—	
One-half the time of 1 man, \$4 per day	680. 00
All the time of 1 man, at \$3.60 per day	1, 020. 00
Lineman: 1 man, at \$2 per day	680. 00
	<u>2, 380. 00</u>

Station E is the only place where I have included the cost of switches and their installation in this estimate.

Station V is so overcrowded now that it will be necessary to have more room on the post-office floor before our machinery can be put in, unless they are willing to have the tube machines in the basement with a lift for raising and lowering the mail. If this were allowed, I think we would have ample room in the basement now occupied by the post-office for our installation.

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Circuit No. 5.—Connecting Station O with Station C and Foreign branch.

CONSTRUCTION.

Station O, terminal station (single)	\$3,096.00	
Station C, intermediate station (single)	4,823.50	
Foreign branch, closed-receiver station	3,821.00	
	\$11,740.50	

ADDITION TO POWER PLANT AT STATION O:

1 boiler	1,625.00	
1 compressor	3,750.00	
1 foundation	1,200.00	
Setting boiler	550.00	
Air and steam piping	1,200.00	
	8,325.00	

GENERAL.

100 carriers	2,000.00	
Total	22,065.50	

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Circuit No. 5.—Operation—17 hours per day.

LABOR.

Station O, 2 men, at \$1.70 per day	\$1,156.00	
Station C, 2 men, at \$1.90 per day	1,292.00	
Foreign branch, 2 men, at \$1.90 per day	1,292.00	
	\$3,740.00	

POWER.

45 horsepower, at Station O	5,491.80	
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GENERAL.

Oil, waste, etc.	90.00	
Repairs, wear and tear, etc., on carriers	1,400.00	
Telephone	300.00	
Petty expenses, maintenance machines	60.00	
	1,850.00	
Total	11,081.80	

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Circuits Nos. 6 and 7.

[Beginning at Station H and connecting all stations between Forty-fourth street and One hundred and twenty-fifth street, inclusive, and terminating at H, with a power station (steam driven) at Forty-fourth street and power station (electrically driven) at Stations W, J, and U.]

CONSTRUCTION.

Power plant, Station H:		
1 125-horsepower boiler	\$1,625.00	
2 duplex compressors	7,500.00	
Setting boiler	650.00	
Steam and air piping	3,350.00	
		\$13,125.00
Power plant, Station W:		
3 50-horsepower motors and compressors	9,000.00	
3 sets foundations	2,400.00	
Air piping	2,900.00	
		14,300.00
Power plant at Station J (same as at Station W)		14,300.00
Power plant at Station U (same as at Station W)		14,300.00
		56,025.00
Total power plants		56,025.00
Station H, terminal station (double)	5,800.00	
Station G, intermediate station (single)	4,700.00	
Station N, intermediate station (single)	4,700.00	
Station W, terminal station (double)	5,800.00	
Station I, intermediate station (single)	4,700.00	
Station J, terminal station (double)	5,800.00	
Station L, intermediate station (single)	4,700.00	
Station U, terminal station (double)	5,800.00	
Station K, intermediate station (single)	4,700.00	
Station Y, intermediate station (single)	4,700.00	
Piping from H to power house	5,200.00	
		56,600.00
500 carriers, 30 by 7 inches		10,000.00
		122,625.00
Total cost of construction of stations and power plants		122,625.00

Operation—Seventeen hours per day.

LABOR.

	Per year.
Station H, 2 men, at \$1.90; 4 men, at \$1.60	\$3,468.00
Station G, 2 men, at \$1.80	1,224.00
Station N, 2 men, at \$1.80	1,224.00
Station W, 2 men, at \$2.50; 2 men, at \$1.70	2,856.00
Station I, 2 men, at \$1.80	1,224.00
Station J, 2 men, at \$2.50; 2 men, at \$1.70; 1 watchman, at \$1.45	3,385.00
Station L, 2 men, at \$1.80	1,224.00
Station U, 2 men, at \$2.50; 2 men, at \$1.70	2,856.00
Station K, 2 men, at \$1.80	1,224.00
Station Y, 2 men, at \$1.80	1,224.00
	\$19,909.00

POWER.

At power house, Forty-fourth street, 100 horsepower	12,204.00
At Station W, 85 horsepower	20,746.80
At Station J, 70 horsepower	17,085.60
At Station U, 80 horsepower	19,526.40
	69,562.80

GENERAL.

Repairs, wear and tear on carriers	7,000.00
Telephone service	2,000.00
1 inspector, at \$3	1,020.00
1 lineman, at \$2	680.00
Petty expenses, maintenance machines	600.00
Waste, oil, etc	400.00
	11,700.00
Total	101,171.80

In the cost of additions to power house A I have assumed that the present power house will be continued and sufficient room added thereto to accommodate the necessary increase in boilers and engines to operate these circuits.

The price of power at this point includes all wages of firemen and engineers, coal, rent, etc., and minor repairs to engines and boilers, as estimated from this item for 1899.

At Station O power has been figured at same price as at power house A.

At Madison Square additional power, made necessary by putting in Station S, has been figured at same rate as now paid the Metropolitan Life Insurance Company, and does not include any cost of maintenance of engines.

At general post-office power has been figured at same rate as now paid New York Steam Company, and does not include any cost of maintenance of engines.

At stations above Forty-fourth street power has been figured at the lowest price at which the electric-light companies furnish power in large units.

The small allowance made for minor maintenance covers only current repairs on boilers, engines, and terminal machines, and includes nothing for replacement of important wearing parts, nor for extensive repairs which may be rendered necessary by accident at any time.

At Stations J, W, and U, I have included no attendance for the power stations other than an extra good man in charge of the post-office station, with a competent assistant.

I have not given details of the cost of installation on these circuits because of the probable changes in the stations themselves before the line is constructed. At Stations J, K, and Y it will be practically impossible to put our machines in the room now occupied by those stations, as they are very much crowded.

Summary by circuits.

CONSTRUCTION.

Stations and power plants:

Adding Station S to circuit No. 2	\$4,681.00
Circuit No. 4	84,168.00
Circuit No. 5	22,065.00
Circuits Nos. 6 and 7	122,625.00

Total for all contemplated circuits	<u>233,539.00</u>
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OPERATION.

Cost per year:

Adding Station S to circuit No. 2	2,000.00
Circuit No. 4	55,593.18
Circuit No. 5	11,081.80
Circuits Nos. 6 and 7	101,171.80

Total for all contemplated circuits	<u>169,846.78</u>
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Respectfully submitted.

B. H. BLOOD,
General Superintendent.

Cost of lines.

CONSTRUCTION.

Estimated cost of new lines as per detailed statement:

Tube and connections	\$624,942.66
Machinery	233,539.00

	<u>858,481.66</u>
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Cost of present system complete, as per contract, etc.	600,000.00
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Total cost	<u>1,458,481.66</u>
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N. B.—The above stated “cost of the present system” is not the actual cost of the present lines. The figures given—viz, \$600,000—arbitrarily reduce the cost of the present system to equal the bonds sold and outstanding, the proceeds of which were insufficient by a large sum to complete the present lines. Therefore the additional funds taken from proceeds of the sale of capital stock and from the earnings from operation are not included, and no sum is included for patents, charters, or franchises. The company, in making the enormous concessions in this item to make the offer of rental attractive, desires it to be distinctly understood that the figures are offered for investigation into the amount of rental asked for the completed system under the proposition embodied in the communication of the company addressed to the Hon. Ch. Emory Smith, Postmaster-General, under date of October 8, and is in nowise a statement of cost or value for the basis of acquirement by the Government, nor for any other purpose, except for the purpose distinctly stated.

TUBULAR DISPATCH COMPANY,
By W. A. H. BOGARDUS,
Vice-President and General Manager.

Cost of operation.

	Estimate, new lines.	Actual, old lines.	Total.
Station operators, wages.....	\$37, 861. 00	\$14, 553. 60	\$52, 414. 60
Power, including wages and fuel.....	106, 845. 78	29, 984. 72	136, 830. 50
Supplies, oil, etc.....	750. 00	143. 80	893. 80
Repairs to carriers and machinery.....	15, 400. 00	4, 967. 24	20, 367. 24
Inspectors, extra operators, and superintendents.....	4, 080. 00	8, 151. 80	12, 231. 80
Telephone system, rental.....	3, 600. 00	1, 650. 00	5, 250. 00
Sundry, general expenses.....	6, 699. 43	.....	6, 699. 43
Taxes.....	11, 749. 76	6, 215. 67	17, 965. 43
Total.....	.....	.....	252, 652. 80
10 per cent of cost.....	.....	.....	145, 848. 00
Proposed rental.....	.....	.....	398, 500. 00

N. B.—The stated cost of operation in the column under heading “Actual old lines” is not the actual cost of operation of the present system as it is now constituted. The figures given are those based on actual operation of the present line, but are reduced and modified to meet the conditions that will be obtained in the operation of the present lines as a complete system, and therefore anticipate economics of extension.

TUBULAR DISPATCH COMPANY.
By W. A. H. BOGARDUS,
Vice-President and General Manager.

BROOKLYN.

REPORT OF THE JOINT COMMITTEE ON PNEUMATIC-TUBE SERVICE
BETWEEN BROOKLYN AND NEW YORK.

BROOKLYN, N. Y., *December 1, 1900.*

The joint committee appointed under Postmaster-General’s order No. 989, of August 13, 1900, met this date, December 1, 1900, at the office of the postmaster of Brooklyn, and has carefully considered the report of the local committee dated October 30, which is herewith transmitted.

The joint committee approves the report of the local committee as to its facts and the scope of the investigation, and believes that its conclusions are reasonable in submitting three distinct propositions.

The first for the establishment of the pneumatic-tube service in connection with seven branch post-offices, A, B, D, E, S, V, and W; distance, 13½ miles.

The second proposition for the establishment of pneumatic-tube service for five branch post-offices, A, B, S, V, and W; distance, 8.88 miles.

And the final proposition for the establishment of tube service to the two most important branches, namely, B and W; distance, 5.17 miles.

These propositions are all conditioned upon the reasonable cost of pneumatic-tube service, both as regards installation and operation. The estimates of the Pneumatic Tube Company, received from Mr. Bogardus, vice-president and general manager of the New York Mail and Newspaper Transportation Company, were also considered and are herewith transmitted. Mr. Bogardus explains that he has not had sufficient time to submit the details of cost, but agrees to make a supplementary proposition which will be ready in a few days, and will then be transmitted to the Department.

The estimates of the tube company on the several propositions above submitted are as follows:

First proposition, \$172,097 per annum.

Second proposition, \$138,113 per annum.

Third proposition, \$105,000 per annum.

The tube company submitted a proposition of their own, this being the third proposition referred to above, with Station A added. The annual cost of operating this service, namely, general post-office with B, A, and W, would be \$102,000 per annum, with the existing service between New York and Brooklyn included.

It is understood that all of the above quoted propositions include the New York and Brooklyn existing service, and are based on the use of an 8-inch tube. It will be observed that the mileage quoted by the tube company in connection with the several propositions differs from the mileage quoted by the local committee, it being based upon the lines of single pneumatic tubes, while the distances quoted by this committee is the approximate straight distance between the several points to be connected and covered by existing contract mail service.

After considering the amount of first-class mail of local origin in Brooklyn and the other statistics tending to show the relative importance of the local service we reach the unanimous conclusion that all of the propositions submitted by the New York Mail and Newspaper Transportation Company are much higher than we would be justified in approving. As already pointed out, they are based upon the employment of an 8-inch tube, whereas it is possible that satisfactory results can be secured with a 6-inch tube.

It is also possible that the final committee of experts to be appointed by the Department may succeed in securing a material reduction in these estimates after analyzing the details which the tube company is yet to furnish.

We would all like to see the city of Brooklyn endowed with first-class postal facilities, not inferior to those enjoyed by any other city in the country of equal development, and we are therefore hopeful that the future may bring about such a revision in the cost of operating pneumatic-tube service as will enable the Department to install it in the city of Brooklyn.

While the existing pneumatic-tube service between New York and Brooklyn is included in all of the above propositions, this committee believes that it is entitled to separate consideration and separate comment. It is regarded as a unique service, connecting two great cities of the country. It has proven very advantageous to the mail service, and we do not think it should be dispensed with if it can possibly be retained at a reasonable cost.

The new estimate of the tube company for this service for the next year (\$41,676) seems to us excessive, but as this proposition will doubtless be analyzed by the final committee, it is hoped that it can be brought down within the limits of acceptance. With the light which the committee has on this subject now we do not think that the present cost of the tube service between New York and Brooklyn (\$20,200, excluding power) represents the minimum price at which the service could be rendered.

J. M. MASTEN, *Chairman.*

E. W. ALEXANDER,
General Committee.

F. H. WILSON,
Postmaster, Brooklyn, N. Y.

V. J. BRADLEY,
*Superintendent Railway Mail Service,
Local Committee.*

BROOKLYN, *October 30, 1900.*

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General.

SIR: In accordance with the Postmaster-General's Order 989, of August 13, 1900, directing an investigation in regard to the present and proposed pneumatic-tube service for mail transmission, the undersigned, the postmaster at Brooklyn, N. Y., and the division superintendent of Railway Mail Service, constituting a local committee under the terms of Order 989, beg to present the following report in reference to the existing pneumatic-tube service for the transmission of mail at Brooklyn, and for the feasible extension of this facility.

EXISTING PNEUMATIC-TUBE SERVICE.

The only pneumatic-tube service for mail transmission of which the Brooklyn post-office has experience is that between the Brooklyn general post-office and the New York general post-office; length of line 1.65 miles; diameter of tube 8 inches; dimensions of carriers $6\frac{1}{2}$ inches in diameter inside measurement by 22 inches long inside and 24 inches long outside measurement.

This tube service was commenced on August 1, 1898, and since that time has been in very successful operation and of great advantage to the mail service. During the past nine months, January to September, inclusive, there were but three stoppages, with an aggregate of three hours forty-three minutes. One of these stoppages of two hours forty-five minutes was really due to the expansion of the Brooklyn Bridge, over which the tube is laid, which made necessary an adjustment of

the sliding connections in certain portions of the tube to compensate for the expansion. However, the total stoppage of three hours forty-three minutes during the nine months was only equal to one-twelfth of 1 per cent of the aggregate working hours during that period. These slight stoppages occurred during the months of May, June, and August. During the other six months there was no stoppage whatever.

According to a test count made in May, 1900, it was found that the amount of first-class mail transmitted through the tube on week days was 162,982 pieces in 569 carriers, thus making an average of 286 pieces per carrier. As the full capacity of the tube was not needed for the transmission of first-class mail, its spare capacity was used for the transmission of paper mail, showing an average of 4,400 pounds on week days and an average of 746 carriers, thus making an average of nearly 6 pounds per carrier.

The expedition of mail matter between the New York and Brooklyn general post-offices has been very great. The mail was formerly carried entirely by wagons, with a transit time of twenty-seven minutes for 1.65 miles, or at a rate of less than 4 miles per hour.

The time in transit by tube is three and one-tenth minutes, or 31.33 miles per hour. By securing the advantage of later closes because of this expedition all mail accumulating within a period of thirty minutes from the time of the former closes is now advanced, some of it even more than the twenty-four minutes' time gained in transit. This quantity of mail has been variously estimated, but a conservative estimate places it at about 10,000 letters daily.

RESULTANT ECONOMIES.

Because of the transfer of all first-class mail between New York and Brooklyn to the tube service, it was possible to reduce the trips of wagon service between the New York and Brooklyn post-offices. This reduction on route 407001 amounted to 34 per cent, equal to a saving of \$1,530 per annum. It was also possible to discontinue direct trips between the New York general post-office and Branch W of the Brooklyn post-office. A saving of 42 per cent was effected on wagon route 407014, equivalent to a saving of \$3,980 per annum. Total saving on wagon service, \$5,510 per annum.

COST OF PRESENT SERVICE.

The cost of the present pneumatic-tube service between New York and Brooklyn, as shown by the Department's records, is: Contract rental, \$14,000 per annum; labor, \$6,200 per annum; total, \$20,200 per annum, or at the rate of \$12,242 per mile per annum. This statement does not take note of other incidental expenses, such as power, etc., which are paid by the Treasury Department.

The former cost of wagon service between New York and Brooklyn was \$4,499.99 per annum. It is thus apparent that the pneumatic-tube service costs over four times as much as the preexisting wagon service, and that in conjunction with the pneumatic tube 66 per cent of the wagon service must be maintained. The gain in expedition (three minutes' transit time instead of twenty-seven minutes) and in frequency (a carrier being dispatched every two minutes or oftener, instead of a wagon being dispatched every half-hour) is certainly very great, and

the tube service can be regarded as not merely desirable, but as practically indispensable between the New York general post-office and the Brooklyn general post-office; but the remaining question as to whether the greatly increased annual cost is fully justified must be left for determination by the joint committee indicated in the Postmaster-General's order, which will doubtless test this question by close analysis and expert testimony.

PROPER EXTENSION OF TUBE SERVICE.

The extension of the pneumatic-tube service to connect the branch post-offices in Brooklyn with the general post-office is regarded entirely as a question of relative cost. There is no hesitancy whatever in declaring that the increased speed of transmission available by pneumatic-tube service is not obtainable in any other known way. The speed of mail wagons is limited to 6 miles per hour and is usually less than that. The speed of street postal cars varies from a minimum of 4.4 miles per hour to a maximum of 9.6 miles per hour, and the best speed available, by using the elevated railways, including the time occupied for messenger service between the elevated stations and the branch post-offices, would not very much exceed the speed of the surface cars. In contrast with this we obtain by the pneumatic-tube service a speed of 30 miles per hour and constantly available frequency of dispatch.

There are 15 branch post-offices in Brooklyn, not including substations. Of these branch post-offices, 5 show individual postal receipts per annum of over \$80,000, the maximum being at Branch W, where the receipts last year were \$141,693. The statistics for the general post-office and the principal branch post-offices are shown in the following table:

Post-office.	Postal receipts, year ended June 30, 1900.	Number of collections.		Average pieces of first-class mail collected daily.	Drop mail daily (letters).	Number of deliveries.		Average pieces of first-class mail delivered daily.	Special-delivery letters delivered during year ended June 30, 1900.
		Week days.	Sundays.			Week days.	Sundays.		
General post-office..	\$629,162.56	11	4	176,728	17,395	5 and 6	.....	183,019	64,600
Branch A.....	81,212.81	10	4	9,800	1,271	5	.....	20,638	7,220
Branch B.....	129,458.15	10	4	13,800	1,988	3 and 5	.....	28,040	24,224
Branch D.....	49,320.97	8 and 10.	4	7,100	252	2, 3, and 5.	.....	18,514	6,940
Branch E.....	42,433.72	8 and 10.	4	5,050	2,716	2, 3, and 4.	.....	8,679	3,940
Branch S.....	101,317.10	10	4	12,200	1,036	5	.....	27,027	12,636
Branch V.....	90,660.15	10	4	13,050	2,534	5	.....	23,132	11,616
Branch W.....	141,693.50	10	4	12,850	4,830	5	.....	30,942	11,776
Total, including general post-office ..	1,165,255.00	.....	.....	250,578	32,022	.....	.....	339,991	142,952
Total for the 7 branch post-offices ..	.....	.....	.....	73,850	14,627	.....	.....	156,972	78,352

VOLUME OF MAIL TO BE TRANSMITTED.

The amount of first-class mail to be transmitted by tube is exhibited in the above table by the amount of mail received (by collection and by drop) and the amount delivered. The report shows that at the

seven principal branches the amount received daily is 88,477 pieces, and the deliveries daily amount to 156,972 pieces, or a total of 245,449 pieces.

In this connection we must note that of the mail received about 83½ per cent comes from collections, which average from 8 to 11 daily in the various districts, and only 16½ per cent of the mail is received by drop at the branch post-office stations. The mail for delivery is sent out by letter carriers on an average of five times daily. On some portions of the general-post-office district six deliveries are made daily, while on some portions of the districts of Branches B, D, and E less than five deliveries are made; in some cases only two or three.

Table showing present frequency of service and comparative speed of present service and the proposed pneumatic-tube service.

Points of transmission.	Distance.	Frequency.		Time in transit and speed.			
		Week days.	Sun-days.	By street car.	Miles per hour.	By tube.	Miles per hour.
	<i>Miles.</i>			<i>Min.</i>		<i>Min.</i>	
General post-office to Branch B	2.44	19	7	23	8	4.88	30
Branch B to Branch D	1.61	19	7	13	7.4	3.22	30
Branch D to Branch E	1.09	19	7	7	9.3	2.18	30
Branch E to Branch S	1.92	19	7	12	9.6	3.84	30
Branch S to Branch A	1.10	19	7	9	7.4	2.20	30
Branch A to Branch W	1.11	19	7	8	4.4	2.22	30
Branch W to general post-office	2.73	19	7	22	7.4	5.46	30
Fulton street to Branch V	1.50	15	5	19	7.5	4.76	30
General post-office to Branch E	5.14			43		10.28	

PROPOSED TUBE SERVICE AND ITS COST.

Although statistics have been given in regard to the importance of the business transacted at seven of the principal branches, it is felt that the extension of pneumatic-tube service must rest entirely upon the relative cost of such service, and this fact can hardly be ascertained until the joint committee designated by the Department has investigated the subject and secured expert testimony.

There was a proposition two years ago that six of the branch post-office stations, B, D, E, S, A, and W, be connected with the Brooklyn general post-office at a cost of about \$200,000 per annum. It does not appear that any such proposition could be favorably considered.

In the first place the amount of mail to be transmitted daily—245,449 pieces—would not justify this heavy additional outlay, and aside from this it is considered that the present frequency of service—from 15 to 19 times daily—is sufficient, in connection with the fact that the mail is only collected from street letter boxes from 8 to 11 times daily; that the drop mail only amounts to 16½ per cent of the whole, and that the deliveries of mail at office of destination only average 5 deliveries per day.

Yet the expedition in transit that can be secured by pneumatic-tube service, and by no other method thus far known, is a great advantage to be secured if possible, especially for long distances. It is not of great importance whether mail which now takes 7 minutes to transmit from Branch D to Branch E may be transmitted in 2 minutes by tube, but it is of much importance on the longer distance from the general post-office to Branch E (5.14 miles), that the present transit time of 43

minutes can be reduced to 10 or 11 minutes by using the pneumatic tube. It is also of great consequence that important branch offices, such as B and W, be connected with important branches in the borough of Manhattan by means of this service, so that savings in transit time of 30 minutes to one hour can be effected.

The cost of the postal-car service on electric lines, which connects six of the most important branches nineteen times daily, is a little over \$1,300 per mile per annum; and bearing this in mind, the following tentative recommendations are made:

(1) If the pneumatic-tube service could be secured at not too great an advance over this rate, it is recommended that the pneumatic-tube service be extended to all seven branch post-offices originally specified, viz, A, B, D, E, S, V, and W; distance, 13.5 miles.

(2) If, however, the aggregate cost should be regarded as prohibitive, it might still be feasible to provide the service to five of the most important branches; and in that event it is recommended that the service be provided for Branches A, B, S, V, and W; distance, 8.88 miles.

(3) If this proposition were found untenable, it might still be feasible to provide tube service between the general post-office and Branches B and W, these being the two most important branches in Brooklyn; distance, 5.17 miles.

ADDITIONAL ECONOMIES.

If the pneumatic-tube service is extended to the several branches as proposed, a considerable reduction can be accomplished in the street postal-car service. A calculation made by the superintendent of mails of Brooklyn, based upon the proposition that the pneumatic-tube service be provided from the general post-office to Branches A, B, S, V, and W, reached the conclusion that the street postal-car service could be reduced to effect a saving of \$8,000 per annum, and that the clerical force in the street postal cars could be reduced to the extent of \$6,000 per annum. If we add this total of \$14,000 to the saving already spoken of in the wagon service, aggregating \$5,510, we find a total possible saving of about \$19,500 per annum, subject to verification when a definite plan for the extension of the tube service is agreed upon.

SIZE OF TUBE.

Judging from the experience with the present tube between Brooklyn and New York, 8 inches in diameter, and according to the reports received from other post-offices of tests made regarding the very small amount of first-class mail which would be excluded from tube transportation because of its bulk or size, it is probable that a 6-inch tube would be sufficient for the transmission of all first-class mail to and from the branches of the Brooklyn post-office, and this size of tube would be recommended if the cost of installation and operation is materially lower than in the case of an 8-inch tube.

SPACE AVAILABLE FOR INSTALLATION AND OPERATION.

A local investigation of the space available in the general post-office and in the branch post offices for the installation and operation of

pneumatic-tube service shows that there is sufficient space at present, provided the compressors are run by electric motors instead of steam power; but if a steam-engine plant is required, additional space, with expense for rental, would be necessary at all or nearly all the branch post-offices.

MOST ECONOMICAL SYSTEM OF TUBE TRANSMISSION.

The local committee is not aware of any practical means of tube transmission other than that employed by the present operating companies, and has received no tenders or propositions from other inventors or companies for the performance of such service.

SINGLE LINES OF TUBES AS FEEDERS.

The question of using single lines of pneumatic tubes as feeders to the main lines of tube service has received consideration, but it is not thought to be a practical subject for consideration at the present time, and the local committee has no recommendations to make in that direction.

ADDITIONAL POSTAGE ON TUBE MAIL MATTER.

The subject of recommending action toward charging an additional postage rate upon mail matter transmitted through the tube has been given careful thought, and as a result the following conclusions have been reached:

The pneumatic-tube service is of especial benefit to first-class mail of local origin and for local delivery. This class of mail produces a revenue to the Department far in excess of any other class of mail matter. Quite often proposals are heard from the public for a reduction in the rate of local first-class matter from 2 cents to 1 cent. It does not therefore seem wise to recommend an increased rate on ordinary first-class matter of local origin under these conditions. It would not be practicable to require an additional rate on first-class matter posted outside of the city for delivery within the city.

Nor would it be feasible, apparently, to charge an additional rate on special-delivery matter, which now pays 10 cents in addition to the ordinary postage.

It might, however, be advisable to charge an extra rate of 2 cents per piece for any matter transmitted through the tube representing supplementary closings for railway dispatches, which are made later than the ordinary closing time.

It might also be wise to charge an extra rate of postage on newspapers transmitted through the tube, if necessary to prevent overcrowding the tube with this class of matter, if mailed later than the ordinary closing time, and if speedy dispatch were expected.

F. H. WILSON,

Postmaster, Brooklyn, N. Y.

V. J. BRADLEY,

Superintendent Railway Mail Service.

NEW YORK MAIL AND NEWSPAPER TRANSPORTATION COMPANY,
New York, December 1, 1900.

HON. FRANCIS H. WILSON,
Postmaster, Brooklyn, N. Y.

SIR: Pursuant to your request of November 19, we are pleased to quote you estimates of the cost per annum of extending the pneumatic-tube service in Brooklyn in accordance with propositions as you name them, each proposition being included and forming part of the present system, viz:

Replying to your first proposition, for completed system, including present lines, \$172,097.

Replying to your second proposition, for extensions named, including present lines, \$138,113.

Replying to your third proposition, for extensions named, including present lines, \$105,000.

In addition thereto we hereby make the following proposition: Your third proposition, with Station A added, \$102,000.

Mileage.—The mileage of the first proposition is 20.643 miles of single-tube extensions. The mileage of the second proposition is 16.097 miles of single-tube extensions.

The mileage of the third proposition is 8.38 miles single-tube extensions.

The mileage of the last proposition is 9.327 miles single-tube extensions.

These estimates are based on the hours of operation of the present bridge system. These estimates are also based on the assumption that the Government will furnish additional necessary steam at the Brooklyn post-office at the same rate they are now furnishing steam for the present lines. Electric power is estimated for other stations.

It is further assumed that sufficient room in the post-offices for our machines and compressors will be provided, and that we shall have the right of way through the basements to the stations.

All estimates are based on 8-inch tube, there being no request for other sizes. It is our judgment, however, that the amount of mail to be transported in the borough of Brooklyn, outside of the congested districts, will not require a tube of 8 inches in diameter.

Your attention is called to the fact that our last proposition is a lower rate, and one additional station added, than your third proposition. This is because of our ability to plan economy of power, by connecting the three stations and having one power house at A, whereas your third proposition will require two power houses.¹

We regret, because of the short space of time allowed us for the intricate figures that are requested, that we are unable to give you details of construction and operation on your propositions. We suggest that our last proposition is the most advantageous one for the Government, and one from which extensions can be made from time to time as the demands of the mail service require. It will take a week or more for us to tabulate the details of all the propositions requested, but we could, by Tuesday next, hand you details on the last proposition.

Awaiting your commands, we are, yours, respectfully,

W. A. H. BOGARDUS,
Vice-President and General Manager.

NEW YORK MAIL AND NEWSPAPER TRANSPORTATION COMPANY,
GENERAL MANAGER'S OFFICE,
New York, October 8, 1900.

HON. CH. EMORY SMITH,
Postmaster-General, Washington, D. C.

SIR: Replying to your letter of July 25, handed to us by your representative, and asking us for information and proposals under two specific heads, we have the honor to reply in the same order as your inquiry, to wit:

In reply to your first inquiry.—The charter granted to this company by the legislature of the State, and its franchises in the city of New York, boroughs of Manhattan and Brooklyn, as well as its lease of the right to cross the New York and Brooklyn Bridge, do not permit us to dispose of the present lines of pneumatic tubes without invalidating our rights for the construction of pneumatic tubes for other purposes over the same routes; hence by sale of this right we would lose a most valuable portion of our franchises and relinquish other valuable rights and privileges. The sale, therefore, of our present system to the Government would not be feasible except by express authority of law, the purchase of our patent rights for the borough of Brook-

¹ In addition to the power station at the Brooklyn post-office.

lyn, and remuneration to the stockholders and bondholders for the value of other assets which are taken by the Government or invalidated by the sale of the present system.

If the Government desires to acquire the existing system—the franchises, patents, and other properties of this company—it is probable that the necessary enabling acts of our legislature can be obtained, and that our stockholders and bondholders will consent to reasonable price and terms. The officers of the company at this time, however, are not prepared to negotiate with the Government.

The construction of the line over the Brooklyn Bridge was accomplished with great difficulty and expense, and its operation is attended by more than the usual danger and difficulties attending the operation of pneumatic tubes. It is our belief that a thorough investigation, such as you are now making by the authority of Congress, will convince the Government that the operation of this system by this company is more economically and efficiently performed than though the lines were owned and operated by the Government.

In reply to your second inquiry.—We hereby propose to contract to carry the mails through our pneumatic-tube system as it now exists from June 30, 1901, to June 30, 1902, upon a contract authorized by Congress, for the annual consideration of \$41,678. Because of the limited length of this system and the expense of construction, this company can not afford to make the Government a proposal at a lower rate. In the foregoing figures, \$7,600 covers the cost of steam power, which has heretofore been supplied by the Government. Three thousand dollars of this sum is paid to the Treasury Department for steam supplied at the Brooklyn post-office. If the Government desires to furnish its own steam, a reduction in rental of the amount of \$7,600 can be made from the figures named.

In the rental named there is included 10 per cent upon the cost of construction, which, after paying the cost of replacements after a life of not exceeding twenty years, leaves only the amount necessary to pay the interest on its bonded indebtedness. Nothing is included for the valuable franchises nor the use of the patents employed. A very small sum is allowed for supervision and rent paid to the city for the use of the ground for the approaches to the bridge.

The consideration called for by the contract with the Government now being carried out by this company is entirely inadequate, and during the term of the said contract the company has lost a large sum of money, besides being unable to meet the interest charges on its bonds. If the Government sees fit to contract for an extension of these pneumatic tubes in the city of Brooklyn this company can make a material reduction in its rate per mile of tube and per station operated, but your inquiry makes no request of us for proposals for extensions.

Respectfully submitted.

A. H. CALEF, *President.*

PHILADELPHIA.

OFFICE OF THE POSTMASTER,
Philadelphia, Pa., December 5, 1900.

Hon. W. S. SHALLENBERGER,
Second Assistant Postmaster-General.

SIR: The joint committee appointed by the Department in pursuance of Postmaster-General's Order No. 989 of August 13, 1900, has met at Philadelphia, holding its final sessions on December 4 and 5, 1900. It transmits as part of its report the memorandum of statistics printed by the postmaster at Philadelphia and containing his general views on the subject of pneumatic-tube service.

We have received the estimates of the Pneumatic Transit Company on the basis of three propositions. These propositions were made up substantially in accordance with the groups of branch post-offices as set forth by the postmaster in his printed memorandum.

The first proposition involved the establishment of pneumatic-tube service connecting the central post-office with branches S, O, C, J, P,

D, and A, seven branches in all, a distance of 7.657 miles. The Tube Company's estimate for this proposition is as follows:

Cost of construction	\$563,061.58
Cost of operation per annum.....	58,601.77
Annual rental (including 10 per cent upon cost of construction).....	114,907.93

The second proposition included the seven branches above named and three additional branches, namely, K, E, and F, making ten branches in all, with a mileage of 12.50. The Tube Company's estimate on this proposition is as follows:

Cost of construction	\$833,969.14
Cost of operation per annum.....	79,599.26
Annual rental (including 10 per cent upon cost of construction).....	162,996.17

The third proposition included the ten branch post-offices mentioned above, with four other branches, namely, Q, R, G, and B, making fourteen in all; distance 19.49 miles. The Tube Company's estimate on this proposition is as follows:

Cost of construction	\$1,157,965.25
Cost of operation per annum	105,821.07
Annual rental (including 10 per cent upon cost of construction).....	221,617.60

After a careful inspection of the three estimates submitted by the Pneumatic Transit Company, the joint committee felt that the cost of rental at the present time was prohibitive of the adoption of any of these propositions except the first, and felt reinforced in this conclusion by noting from the statistics compiled by the postmaster at Philadelphia that the postal territory, comprising the districts of the central post-office and the seven branch post-offices named in the first proposition, namely, S, O, C, J, P, D, and A, comprises 83.5 per centage of the total annual receipts of the Philadelphia post-office, and 87 per centage of the total first-class mail originating in the city of Philadelphia—that is to say, the postal territory including the central post-office and these seven branch post-offices collect \$3,008,954 out of the total annual receipts of \$3,396,672, and in this district there originates daily 561,000 pieces of first-class mail out of an aggregate for the whole city of 646,000 pieces.

The joint committee therefore feels that if this first proposition can be justified, and it is believed that it can be, and if the department can recommend to Congress the establishment of 7.65 miles of tube service, the principal district in Philadelphia will be provided with the best facilities for local interchange of mail in the most efficient and speedy method known.

Before discussing in greater detail the first proposition, we feel it necessary to comment in general terms upon the estimates submitted by the Pneumatic Transit Company. These estimates have been carefully examined by this committee as far as time will permit, and it is our unanimous opinion that the Tube Company in its desire to avoid making an estimate which might involve the company in loss, has overstated the amounts chargeable to a number of large items of expense, and it is our confident belief that if a contract were entered into and supervised in its details by departmental experts, the estimate of the Pneumatic Tube Company could be reduced in the aggregate by from 20 to 25 per cent.

Concluding that the first proposition, viz, connecting seven branch post-offices with the central post-office is the only one feasible for

practical consideration at this time, we might discuss briefly its salient points in contrast with deductions of our own relative to possible economies in the service as an offset to the additional expense.

As already stated, the Tube Company's proposition for the rental of 7.657 miles of pneumatic-tube service, connecting the central office with branches, S, O, C, J, P, D, and A, is \$114,907.93. We have already commented upon this amount by intimating the possible reduction of something like 20 per cent, the consideration of this subject resulting in this conclusion, includes as one idea the possibility of providing power for the operation of the pneumatic-tube system by a plant in the basement of the general post-office building (a Government building), thus relieving the Tube Company from the expense of erecting a new power house for this special purpose (at a cost of over \$36,000), and also ultimately enabling the Post-Office Department to introduce economies of operation in providing the power, which probably would be feasible, because of its operation in connection with other steam or electric power in the Government building, this combination resulting in economy which always naturally follows coordination of work as compared with separated work.

The rental assigned to the first proposition, \$114,907.93, is based by the company upon two items. First, the cost of annual operation, \$58,601.77, and second, a sum equal to 10 per cent on the cost of construction, \$563,061.50, i. e., \$56,306.15 produces the annual rental of \$114,907.93. Now, we suggested above that the power house might be saved. If we subtract this amount \$36,456 from the cost of construction already quoted above, the cost of construction is \$526,605, and if the resultant amount \$526,605 is reduced by 20 per cent, which we estimate to be the very liberal allowance which the company has included for contingencies, the true cost of construction would be nearly, say, \$421,284. Therefore, the item of interest on the cost of construction at 10 per cent would be reduced in this one example from \$56,306.15 to \$42,128.

It seems likely to this committee that when the final committee appointed by the Department passes upon these estimates in detail, it will be unwilling to concede that an interest of 10 per cent should be allowed on all of the items which are included by the Pneumatic Transit Company in its estimate for cost of construction, such as engineering expenses, office expenses, and payments of licenses and royalties for use of Batcheller patents.

As another illustration of the possibility of reduction in the estimate, we note that the annual cost of operation (\$58,601.77) includes the item of \$19,200 for operators and compressor men at the branch post-offices and the central post-office. After careful thought we reach the conclusion that one-half the number of operators will be sufficient for satisfactory service, thus resulting in reduction of \$9,100, leaving a balance of \$49,502.

Joining these two items of revision, one in the cost of construction and the other in the cost of operation (both items selected because they are rather more obvious than others), we find the rental, less these deductions, to be \$49,502, plus \$42,128, making \$91,630, as against the company's estimated rental of \$114,907.93.

POSSIBLE ECONOMIES.

In contrast with the proposed additional expenditure of \$114,000 per annum, or of \$91,000 per annum as we have revised it, or perhaps a still lower sum reached by further revision, we have calculated possible reduction in the existing city mail transportation service and possible additional revenue, with the following results:

Reduced cost of electric postal-car service (present cost, \$37,707).....	\$19,976.87
Saving on existing city mail-wagon service, \$3,440; less new expense for new wagon service, \$1,400. Net reduction	2,040.00
Saving on electric-car clerks (8).....	6,000.00
Estimated additional revenue from increased special-delivery business, based on a reduced compensation to delivery messengers.....	10,000.00
Saving on clerical force, estimated.....	4,200.00
Total.....	42,216.87

If we match these possible economies, plus additional revenues, \$42,216.87 per annum, against the estimate of the Pneumatic Transit Company for annual rental, \$114,907.93, we find the net additional expense per annum to be \$72,691.06. But if we take the reduced estimate for annual rental as worked out by the committee, namely, \$91,630, and subtract from this the estimated savings, \$42,216.87, we find a net additional annual expense of \$49,413.13. This additional expense of \$49,400 per annum represents less than 3 per cent of the net revenue annually turned over by the Philadelphia post-office to the general revenues of the Department. It represents about 11 per cent of the annual profits from first-class mail of local origin for local delivery, which profits we estimate to be about \$446,000 per annum, this being based on the idea that 35 per cent of all first-class mail originating in Philadelphia is for local delivery.

Another interesting comparison is in connection with the existing service within the city of Philadelphia. The present annual cost of this service is about \$99,000 per annum, and includes the existing postal-car service, mail-wagon service, and pneumatic-tube service, connecting the central post-office with the two railroad stations, as well as with the Bourse branch office. The new and additional expense represents about 50 per cent of the present outlay for city transportation, but for this amount the central post-office would be connected with 7 of the most important stations, representing, as we said at the beginning, 84 per cent of the annual postal receipts of the city of Philadelphia, and 87 per cent of the total first-class mail originating in the city of Philadelphia.

We recommend that the Post-Office Department reduce the compensation to special-delivery messengers in districts where pneumatic-tube service is provided from the rate of 8 cents per letter to 5 cents per letter, thus enabling the Department to get some of the additional revenue which is expected to come from the increased special-delivery business, stimulated by the existence of a pneumatic-tube service.

The committee is prompted to suggest this reduction in the compensation to the special-delivery messenger service, because we feel confident that the messengers will, in the aggregate, earn as large a compensation as they now receive, owing to the increase in the volume of business, and the fact that they can deliver a greater number of letters on each trip. It is expected that this will be the means of a greater number of messengers reaching the limit of compensation of

\$30 per month, which limit is at present reached by only 28 of the special-delivery messengers, out of the total number of 106 employed in the city of Philadelphia.

This committee feels that its estimates have been made on a very conservative basis, and is therefore disposed to assume that the net charge against the postal revenues for the additional pneumatic-tube service included in the first proposition (central post-office and seven branches) should not exceed \$49,413 per annum, because no especial effort has been made to analyze all of the items in the estimate of the Pneumatic Tube Company so as to reach the final and absolute amount. We also believe that this additional charge would not be excessive when compared with the net revenue accredited to the Philadelphia post-office, or when compared with the absolute profits which the Post-office Department enjoys from the local postal business in Philadelphia. We therefore recommend that the Department give its approval to this proposition.

As regards the existing pneumatic-tube service between the Philadelphia central office and the Bourse branch, also between the Philadelphia central post-office and the Reading terminal and Broad street station, which costs \$34,566 per annum, the tube company simply indicates its willingness to continue at the same rate of compensation; but our discussion of the matter seems to show that it will be possible to introduce economies of operation on the existing system whenever the contracts for pneumatic-tube service in Philadelphia are extended or revised.

Very respectfully,

J. M. MASTEN,

Chairman,

E. W. ALEXANDER,

General Committee.

THOMAS L. HICKS,

Postmaster,

V. J. BRADLEY,

Superintendent Railway Mail Service,

Local Committee.

MEMORANDA COMPILED BY THE PHILADELPHIA POST-OFFICE RELATIVE TO PNEUMATIC-TUBE SERVICE.

HON. SECOND ASSISTANT POSTMASTER-GENERAL,

Washington, D. C.

DEAR SIR: Your communication of August 14, transmitting copy of Order No. 989, issued on August 13 by the honorable Postmaster-General, with relation to the pneumatic-tube service, came duly to hand, and in compliance with your request I immediately communicated with Hon. V. J. Bradley, division superintendent of the Railway Mail Service, with office in New York City, presenting to him a copy of your communication with copy of Order No. 989, and asking his cooperation in the work therein laid out.

Because of the importance of this subject I have concluded, even at the risk of making this report longer than usual, to embrace each item and step in the correspondence, so as to thoroughly cover the entire situation, and will begin with the communications referred to, following with each paper in its regular order, thus submitting a complete and, I hope, comprehensive report, which will be in accordance with your wishes as to form and completeness, if not as to conclusions.

I have the honor, therefore, to present the following:

AUGUST 17, 1900.

Mr. V. J. BRADLEY,

Superintendent Railway Mail Service, New York, N. Y.

DEAR SIR: I am in receipt of a communication from the honorable Second Assistant Postmaster-General, conveying to me copy of Order No. 989, issued by the honorable Postmaster-General on August 13, with relation to the pneumatic-tube service, and requesting that I arrange with you to take up as soon as practicable the investigation outlined in the order.

I have the honor to herewith transmit copy of communication from General Shallenberger, as well as a copy of the order referred to, and shall be pleased to have you advise me at your earliest opportunity when it will suit your convenience to take up this investigation.

Very truly and respectfully,

THOMAS L. HICKS, *Postmaster.*

POST-OFFICE DEPARTMENT,
SECOND ASSISTANT POSTMASTER-GENERAL,
Washington, August 14, 1900.

Mr. THOMAS L. HICKS,

Postmaster, Philadelphia, Pa.

DEAR SIR: I inclose herewith a copy of Order No. 989, issued yesterday by the Postmaster-General, in relation to pneumatic-tube service.

You will please arrange with the division superintendent of the Railway Mail Service to take up, as soon as practicable, the investigation outlined in this order, and communicate with this office freely as to any further information or instructions that may be desired from time to time.

Yours, truly,

W. S. SHALLENBERGER,
Second Assistant Postmaster-General.

RAILWAY MAIL SERVICE, OFFICE OF SUPERINTENDENT,
New York, N. Y., August 20, 1900.

THOMAS L. HICKS, Esq.,

Postmaster, Philadelphia, Pa.

DEAR SIR: I beg to acknowledge your letter of August 17, inclosing a copy of a letter definitely regarding the pneumatic-tube investigation directed by the Postmaster-General's order No. 989, in regard to an investigation of the pneumatic-tube service in Philadelphia.

I will take pleasure in communicating with you again on the subject as soon as I receive some further information from the Department.

Respectfully,

V. J. BRADLEY, *Superintendent.*

RAILWAY MAIL SERVICE,
OFFICE OF SUPERINTENDENT,
New York, N. Y., September 7, 1900.

THOMAS L. HICKS, Esq.,

Postmaster, Philadelphia, Pa.

DEAR SIR: There has been some unavoidable delay in communicating with you definitely regarding the pneumatic-tube investigation directed by the Postmaster-General's order No. 989, of August 13 (transmitted with your letter of August 17), partly owing to the necessity of obtaining further information from the Department, but mainly from the desire to lay out the groundwork of the investigation, so that the results in the several cities in which I am directed to investigate (New York, Brooklyn, and Philadelphia) may be complete and uniform so far as possible.

Following the preliminary steps adopted in New York and Brooklyn, I have to request that you will have statistical information prepared in accordance with the three tabulated forms herewith transmitted.

Form 1 deals with the comparative speed of mail transmission as it has existed, does now exist, and is possible under the pneumatic-tube arrangement.

Form 2 deals with the prescribed frequency of service and the possible frequency of service by using the pneumatic tubes.

Form 3 calls for certain statistics relating to the general post-office and branches—where it has been proposed by your office that pneumatic-tube service be put into

effect—so that some judgment may be formed in regard to the importance of the several branches, their business, and the amount of mail to be transmitted.

In addition to this it is desirable to have before the committee similar information regarding the existing pneumatic-tube service in your city. This may be covered by answers to the following queries:

First. The amount of first-class mail transmitted through the tube to and from the Pennsylvania (Broad street) Station and to and from the Reading Terminal Station.

Second. The number of carriers dispatched each way daily by each tube.

Third. The average number of pieces of first-class mail to each carrier transmitted.

Fourth. The number of pieces of mail, other than first-class, transmitted through these tubes daily.

Fifth. Specify instances of any material gain to daily newspapers by the use of the tube.

In addition to these statistical facts, some general statements would seem desirable.

First. Is it deemed desirable to send paper mail at all through a pneumatic tube, 8 inches or less in diameter?

Second. What additional expenses have been involved to the Department because of the adoption of the pneumatic-tube service, and its possible extension?

This would particularly relate to clerical force, used mainly or exclusively for the tube service, and which would be assigned to other work, if the tubes did not exist.

Third. Specify definitely any economies which have resulted to the service by the use of the tubes.

Fourth. It would be desirable to prepare a map, in duplicate, showing the proposed extension of the tubes to the branches specified in your letter of October 4, 1899, to the Second Assistant Postmaster-General.

Fifth. A statement should be made showing what available space there is in the central post-office, and also at each of the branch post-offices for the installation and operation of the proposed tube service; and if the space is insufficient, what would be the cost of renting the additional space that would be necessary.

Sixth. It would seem well to have your staff consider the advantage, if any, which might accrue from the use of auxiliary lines of tubes to substations. Would it be probable that by this means the carrier or collection force could be reduced, or that the tour of collection or delivery could be abbreviated, so that mail would be collected and dispatched more rapidly than at present?

Seventh. There is also the question of special postage rate. Would this be justifiable; and if so, in what class of matter, and what would be the probable revenue?

There still remain the larger questions as to the true cost of construction, the possibility of using other systems of tube transportation, the possible economy of ownership by the Government instead of leasing, which it may be difficult to answer until the joint committee engages expert engineering help on these problems. But, if you have acquired any information on these points, I would suggest that it be committed to writing, or tabulated, so as to be ready for the joint committee.

It is my present expectation to seek the opportunity for a personal conference with you on the whole subject early next week in Philadelphia, but it has occurred to me that the collection of information and its systematic presentation may be under way in the meantime.

While I have specified somewhat definitely what seems to me a desirable scope for the investigation to cover, you will of course understand that it is simply a tentative proposition; and if you desire to modify it in any way—especially in the way of explanation to cover additional points of interest—not included in my scheme of inquiry, I will thank you to do so.

Respectfully,

V. J. BRADLEY, *Superintendent.*

After the receipt of Mr. Bradley's communication of September 7 we had a preliminary conference relative to the character of the information which was being accumulated. At this conference I submitted to him copies of tables (some of which are hereto attached) and, subsequently, under date of October 3, he sent me another communication (asking for additional information) which reads as follows:

RAILWAY MAIL SERVICE,
OFFICE OF SUPERINTENDENT,
New York, N. Y., October 3, 1900.

THOMAS L. HICKS, Esq.,
Postmaster, Philadelphia, Pa.

MY DEAR MR. HICKS: After giving considerable study to the statistics furnished, it occurs to me that it might be well for your officers to prepare information on the following additional points:

1. How many miles of electric postal-car service could be reduced in Philadelphia if the pneumatic-tube service were extended to all of the stations which you have outlined, and what would be the amount of the financial saving per annum?

2. How much mail-wagon service could be discontinued, and what would be the amount of the saving per annum?

3. How frequent should the new service be which would have to be provided to connect the stations with each other for the transportation of mail matter which could not go through the tube, and what would be the probable cost of this service?

4. How much space is available, or, rather, is sufficient space available at the general post-office and all of the branch post-office stations you have mentioned for the installation of the pneumatic-tube plant? If additional space were needed, what would be the rental per annum?

5. As pertaining to the general discussion of the subject which would be had in joint committee, I would be glad to know what proportion of all first-class mail matter posted in Philadelphia is for local delivery.

Would you deem it well to formally request the Pneumatic Transit Company to submit an estimate in regard to the lowest possible cost of installing and operating the several circuits outlined in your tentative proposition; and are there any other companies or individuals who could be similarly requested to furnish propositions?

In connection with any such proposition it is instructive for us to bear in mind some of the present rates for the highest class of service.

The heaviest and most important railroad mail route in the United States is that between New York and Philadelphia on the Pennsylvania Railroad. At the last weighing it carried more than 300,000 pounds per day over the entire route;¹ and the cost to the Department is at the rate of \$3,422 per mile per annum. This rate has been criticised by witnesses before the postal commission as being very exorbitant.

The rate per mile on the New York Central road between New York and Buffalo is \$2,794 per mile per annum.

It is also well to note the rate per mile for the electric postal-car service in Philadelphia. The Philadelphia and Southwest circuit, connecting Branches P, D, and A with the general post-office, with 19 trips per day, is only \$705 per mile per annum.

I suppose the principal discussion of terms will be by the joint committee; yet the Department's instructions seem to require us to ascertain the cost, with the evident intention of having it analyzed and checked by the joint committee, with the help of engineering experts.

Very truly, yours,

V. J. BRADLEY, *Superintendent.*

After having considered the instructions and suggestions contained in the foregoing correspondence, I issued directions to the mailing and delivery divisions of this office to keep careful count for a number of days and to make a careful and accurate estimate from these counts, so as to compile reliable information as to the conditions of the service and the quantities of mail handled by the several divisions, branches, and stations, the result of which will be found in the tables contained in the appendix to this report, which tables, it will be noticed, are designated by letters A to S, inclusive, and are referred to by letter from time to time in the report.

The questions presented in the extract from the act of Congress, quoted in Order No. 989, and the instructions of the honorable Postmaster-General which follow the quotation, as well as the questions propounded by Mr. Bradley in his communications of September 7 and October 3, are so numerous and varied that, while I believe they fully cover every possible contingency, they, at the same time, make it quite difficult to answer satisfactorily in a single communication.

Bearing in mind the injunction contained in Order No. 989 that reports are to be prepared with reference to the needs of the service and the best interests of the Government, so as to furnish information that will enable Congress to determine whether the service shall be owned, leased, extended, or discontinued by the Government, in submitting the following, beg to say that I have endeavored to be extremely careful so as to furnish only reliable data secured from the operations of the Philadelphia post-office and from the use of the pneumatic-tube service now in operation.

My excuse for the length of this report is the fact that the act of Congress contemplates and asks "all facts bearing upon the use of said tubes in connection with the mail service."

I have, therefore, the honor to present the following, arranging the several questions, suggestions, or propositions so that I believe they will cover all points which have been raised, and follow each question, suggestion, or proposition with its answer or with such information as I am able to furnish:

1. Should the carriage of mail by pneumatic tube or other similar devices be recommended?

¹With a frequency averaging 42 trips per day over the entire route.

To this question the answer of Philadelphia would be an emphatic "Yes," based upon the belief that our experience with the pneumatic-tube service justifies the following conclusions:

(a) That it affords a continuous service in the sense that mail matter may be dispatched in any quantity from a single piece to the extreme capacity of a single carrier, as rapidly as it accumulates. With a 6-inch tube under five pounds pressure, giving a speed of about thirty miles an hour, would mean safely from 200 to 400 pieces every twelve or fifteen seconds.

(b) That it effects a great saving in time, with the result of making more prompt connections.

(c) That it eliminates danger of delay occurring from fires, processions, riots, etc.

(d) That it removes danger from theft en route, as there is no chance of any one touching the mail from the time it is put in the tube at one station until the carrier arrives and is opened at the next.

(e) That it prevents the possibility of the delay of an entire mail.

(f) That it effects a saving of labor which can be used to advantage in other branches of the service.

Mail is rushed swiftly from city to city at great expense, upon trains that, traveling at the rate of a mile a minute, are met at the city depot by wagons barely capable of going four miles an hour. Premiums are offered for phenomenal train speed, but it is impossible to accelerate the wagons. Minutes saved, at immense cost, by the speed of trains are wasted by indifferent wagon drivers.

Sometimes during its transit a letter passes more time in the wagons than upon the trains.

The pneumatic tube is the only agency whereby the speed attained by trains moving through open country can be equalled or surpassed within city limits.

Incoming mail—late mails still further delayed by failure of wagons to meet trains. Tubes always ready; wagon service is necessarily regulated by complex schedules. When a train is late, the wagon schedule is thrown into confusion, and there may be no wagon in waiting when the train arrives. The mail is then further delayed for want of conveyance. This frequently occurs in all cities. During periods of inclement weather, when trains are irregular, wagon service becomes demoralized.

The tube, on the other hand, once in operation, is always ready for duty. Whether late or on time, incoming mail is conveyed from the depot immediately.

Owing to this feature and to their wonderful celerity of action, pneumatic tubes minimize the liability of failure of connections when train service is irregular.

In Philadelphia, the time of transit of a pneumatic carrier from the Broad Street Station to the post-office is one minute fifteen seconds. The time necessarily allowed a wagon on the same route is fifteen minutes, five minutes for loading and ten minutes for the trip. Much of the mail sent through the tube is in the post-office and separated for distribution before the wagon from Broad street arrives at the post-office.

Mail for outlying stations is taken from the Philadelphia post-office by trolley cars leaving every hour. Notwithstanding the shortness of the distance between Broad street and the post-office it frequently happens that connections with these car trips are made that could not be made but for the tube.

In the case of trains scheduled to make close connections with street-car or wagon trips for outlying stations, as above, or with carrier deliveries, failure to so connect may delay the delivery of mails from one to three hours. Such a delay is particularly serious if the time be near the close of banking hours, or in the morning when business men expect their daily mail orders.

In the case of through or transit mail, failure of connection for a distant city may mean a delay of hours or even days. The volume of such mail transferred between depots in Philadelphia is about 80,000 pieces daily. (See Tables C and D.)

In Philadelphia, between the Broad Street Station and the Reading Terminal, connections otherwise impossible are now daily made by means of the tube.

With the pneumatic tube the pouching is done at the depot. Mail is not allowed to accumulate at the post-office, but is immediately sent to the depot and pouched there at once. When the time of departure of the train arrives nothing remains to be done but to close and lock the pouches and place them on board, which requires but a few minutes. Dispatches can thus be held open to the public far longer. This system in Philadelphia daily advances not less than 30,000 letters by one dispatch.

Local mail—special-delivery letters made as expeditions as telegrams. In the handling of local mail, as well as of other mail passing between post-offices and branch stations, the pneumatic tube will effect a time saving. Letters deposited at one station for delivery at another will be no longer obliged to wait for a trip by wagon or car. In the operation of the tube the next trip always occurs immediately.

When the system in any one city has been made reasonably complete, local special-delivery letters will be quicker than telegrams.

Fifty-nine per cent of the weight of mails carried upon trains, for the transportation of which the Government pays by the pound, consists in the leather and canvas equipment. Pouching at the depots reduces the number of pouches and sacks required by concentrating the mail into the minimum number. In Philadelphia this depot pouching has already diminished by 150 the number of pouches sent out daily.

It is true that tube service is more expensive than wagon service over routes where the volume of mail handled is not sufficient to utilize the tube's full capacity, but in even greater ratio is tube operation more efficient.

2. Give instances of any material gain to daily newspapers by use of tube.

In Philadelphia the financial papers from New York arrive at 6.50 a. m. Trolley cars leave the post-office for different parts of the city fifteen minutes later. Prior to the construction of the tube the wagon contractor received a premium of \$3 per day for rushing these papers to the post-office in time for the first carrier delivery. At present these papers reach the post-office in time not only for the delivery, but even for the trolley cars, and are now delivered from station also by the first morning delivery.

3. Is it desirable to send paper mail at all through tube, 8 inches or less in diameter?

It is believed that the newspaper work can be transmitted through a 6-inch tube, excepting the great quantities shipped daily by the newspaper publications for points outside of Philadelphia, and the large shipments sent out weekly, monthly, or at stated periods by publications having a large circulation, but inasmuch as we now have an arrangement by which nearly all of this class of matter is delivered by the publishers to the railroad stations, I believe it is possible that all other newspaper matter can be handled through a 6-inch tube between the main post-office and stations and the 8-inch tube now in use to the Pennsylvania Railroad and Reading Railroad stations.

4. Specify any economies resulting to the service by the use of tubes.

In the Philadelphia service there is a great economy of time in the handling of large quantity of mail in transmission between the Pennsylvania Railroad and the Philadelphia and Reading Terminal. There is a great saving of time by reason of our ability to advance from 30,000 to 40,000 letters per day one dispatch each, by reason of closer connection and a reduction of time in forwarding mail from the central post-office to the railroad stations. The economies from a financial standpoint are treated under other heads.

5. What is the most economical and practicable system, both as regards installation and maintenance?

Having had no experience with any other system than that in use at the Philadelphia office, a satisfactory answer can not be given to this question in comparing the cost of the system at this office with that of any other which may be known to other places.

As for the practicability of the Philadelphia service, would say that it has been most satisfactory, and it is entirely within bounds to say that 95 or 96 per cent of all mail matter can be handled between the central post-office and the Pennsylvania Railroad Station and the Philadelphia and Reading Terminal Railroad Station, from which two points probably 75 per cent of all the Philadelphia mail is dispatched.

During the time in which the present system has been in use at this office the accidents have been so few, the damage to mail matter so little, the delays so seldom and of such short duration, when taken into comparison with the advantages accruing to the service in general, that it reduces the matter of accident or damage to a minimum.

6. What size of tube is deemed best for the present and prospective demands of the service?

With the present 8-inch tube connecting the main office with the two principal railroad terminals, a system of 6-inch tubes to connect the main office with the several stations hereinafter mentioned is deemed the best and all that is sufficient for the Philadelphia service for years to come.

7. Should single lines of small tubes be used as feeders for trunk lines?

In answer to this would say that the reply to the preceding question covers fully the situation, so far as it relates to the Philadelphia service, based upon our experience.

It is believed that a system composed of 6-inch tubes can be adjusted with greater accuracy to the requirements of the service than one composed of larger tubes, and it follows that the tube of the smallest diameter that will accommodate the "packages" of letters and other articles that pass through the mails is best. For this work it is believed that the 6-inch tube is best adapted, and while, as before stated, from 95 to 96 per cent of all mail can be passed through a tube of this size, it is believed that the actual percentage is considerably higher.

The maximum capacity of a 6-inch tube, under a pressure of 5 pounds and under favorable conditions, is put at 120,000 pieces of letter mail per hour, or 2,400,000 pieces per day of twenty hours.

The maximum capacity of an 8-inch tube, under the same conditions as above described for the 6-inch tube, is about 180,000 pieces of letter mail per hour, or 3,600,000 pieces per day of twenty hours.

For connections with railroad depots, nothing less than 8-inch tubes should be considered, as the mail arrives in bulk at intervals, and does not pass continuously, as in comparison with the station service.

In the Philadelphia service the 8-inch tube is at present used for not more than 35 per cent of its maximum capacity in handling the first-class mail which passes between the main office and Broad Street Station, though this depot is the second in the United States, I am advised, in point of volume of mail matter handled.

8. What stations in the Philadelphia service are suggested as being those to which the pneumatic service is most applicable?

In addition to continuing the 8-inch tube service now in operation between the central office and the Pennsylvania Railroad Station and the Philadelphia and Reading Terminal Railroad Station, and the 6-inch service now in operation between the main office and the Philadelphia Bourse Station, it is believed the service should be extended so as to include the following stations arranged in groups, and in the following order as to importance:

First group	Stations S, O, C, J.
Second group	Stations A, D, P.
Third group	Station B (West Philadelphia).
Fourth group	Stations K, E, F (Frankford).
Fifth group	Stations Q, R, G (Germantown).

9. What is the volume of mail passing between points where the installation of the service may be recommended?

(See Tables E, F, G, H, I, J, N, O, P, Q, and R.)

10. Is sufficient space available at terminal points and intermediate stations for installation of plant?

From an examination of the several stations included in the Philadelphia proposition it is believed that sufficient space is available at terminal points and intermediate stations for the installation of the plant, although in some cases it will require a shifting of furniture and some slight changes, all of which come within the meaning of the several leases and can thus be brought about at the expense of the landlords, but if necessary to be made at the expense of the Department, or brought within the contract for pneumatic service, the aggregate expense of all changes, it is believed, will not exceed two or three thousand dollars.

11. Can you give any estimates and proposals as to cost of stations?

As the stations proposed to be used in this city are already erected, in use and under lease, I do not see that this question needs an answer; if, however, it relates to power stations connected with the pneumatic service, would say that the cost of stations of this kind is included in the estimate given under the cost of construction.

12. What mileage of construction would be required to carry out the suggested extension of the pneumatic-tube service in Philadelphia?

About 20 miles of double line of tubing.

13. What would be the estimated cost of construction?

To this question I can not give a satisfactory or conclusive answer, but having had the advantage of some practical experience and an opportunity of acquiring some general knowledge of work of this class, would estimate that the tube construction, including all expenses for patents, royalties, machinery, and special work, under conditions such as exist in Philadelphia, would not exceed the following approximations:

8-inch tubing:		Per mile, complete.
Minimum		\$30,000
Maximum		50,000
6-inch tubing:		
Minimum		25,000
Maximum		40,000

For a 20-mile system in Philadelphia this would give approximately from \$500,000 to \$800,000 as the estimated cost of constructing 20 miles of 6-inch tube service for completing the circuits between the central office and the 14 principal stations mentioned, putting the system in complete and satisfactory working order.

14. What would be the estimated cost of operation?

Like the preceding question, I have been unable to secure any definite or satisfactory information, but with the little knowledge acquired from the system in opera-

tion at this office would say that at the outside, including interest on investments, supplying power, etc., the estimated cost of operation should not exceed the annual sum of from \$120,000 to \$160,000 per year for the complete service suggested for this city.

15. What is the comparative speed of mail transmission as it has existed, now exists, and is possible under the pneumatic-tube arrangement?

The comparative speed as exhibited in detail in Table A shows that the electric street car service is about twice as rapid as the old wagon service, and the pneumatic-tube service, under ordinary conditions, is at least four times as fast as the electric street car service.

16. What is the prescribed frequency of service and possible frequency of service by using pneumatic tubes?

The frequency of service under present conditions for week days and Sundays by wagon service and electric street car service is shown in Table B, in comparison with what would be the service under very ordinary conditions with the pneumatic-tube service.

17. What is the amount of first-class mail transmitted through tube to and from Broad Street Station?

Six hundred and sixty-seven thousand eight hundred and twenty-one pieces of first-class mail daily. (See Tables C and D for details.)

18. What is the amount of first-class mail transmitted through tube to and from Reading Terminal?

Seventy-eight thousand five hundred and sixty-seven pieces of first-class mail daily. (See Tables C and D for details.)

The amount of transit mail transmitted through tube between the Pennsylvania Railroad depot and the Reading Terminal depot, without being brought to the central office, is 79,603 pieces of first-class mail daily. (See Tables C and D for details.)

19. What is the number of pieces of mail other than first-class transmitted through these tubes daily?

Forty-three thousand three hundred and ninety-two pieces daily. (See Table C for details.)

20. What number of carriers are dispatched each way daily by each tube?

Approximately, 2,943. (See Table C.)

21. What is the average number of pieces first-class mail to each carrier transmitted?

About 150 pieces. (See Table C.)

22. What would be the additional expense involved to Department because of adoption of pneumatic-tube service and its possible extension?

(Relating to clerical force used on tube service which could be assigned to other work, if tubes did not exist).

It is not claimed that the adoption of the pneumatic-tube service will result in any reduction of the clerical force, but it is firmly believed that it will enable the clerical force now employed to more satisfactorily handle the mail matter, and will result in enabling them to handle the increased volume of mail with a smaller proportionate increase in the clerical force in the future because of the regularity with which it may be transmitted and disposed of.

As the strength of a chain is determined by the strength of its weakest link, so is the capacity of the postal service determined by the ability of the force at hand to rapidly dispose of the mail matter at a given hour or two hours in each twenty-four, when the rush is at its maximum.

23. Could the carrier or collection force be reduced by the use of the pneumatic-tube service?

Under no circumstances would I recommend a reduction of the carrier or collection force in the city of Philadelphia, where the great bulk of territory now has but two, three, and four deliveries.

24. Could tour of collection or delivery be abbreviated, so that mail would be collected and dispatched more rapidly?

The tour of collections and deliveries can not be abbreviated, for the reason that nowhere in Philadelphia does the collection service begin to meet the actual requirements of the public, except in the central office district. In all parts of the city mail is required to lay too long in letter boxes after being deposited, and in some places must lay in the letter box for as great a length of time as should be required in its dispatch and delivery.

We hope, however, that the pneumatic-tube service will enable us to handle collections made with more frequency and greater dispatch.

25. What proportion of all first-class mail matter posted in Philadelphia is for local delivery?

A careful estimate justifies the statement that 40 per cent of all the mail posted in Philadelphia is for local delivery, and with the pneumatic service it would mean

much quicker delivery. This percentage would be very largely increased, and much of it would be of the special-delivery class, which would greatly increase the revenue.

26. How many miles electrical postal-car service would be reduced if pneumatic-tube service was extended to all stations as outlined?

Discontinue electric-car service on routes 310025, 310026, 310027, 310028, 310029, and 310011, a total of 35.16 miles.

27. What would be the amount of financial saving per annum?

Thirty-eight thousand dollars.

28. What is the rate per mile for electric postal-car service in Philadelphia?

Under the present contract, 35.16 miles cost \$38,000 per year, being at the rate of \$1,080.76 per mile per year for the maintenance of this service, exclusive of salaries of clerks employed on cars.

29. How much mail-wagon service could be discontinued, and what would be the amount of saving per annum?

Discontinue wagon service on route 210342, between central office and Market street siding.

Route 410001, Station A to Union Traction Company and Broad street station.

Station B to Powelton avenue station (Pennsylvania Railroad).

Station P and Union Traction Company.

Route 210610 between Station S and Union Traction Company.

Route 410005 between Station K and Union Traction Company.

Route 410006 between Station O and Station C, between Station O and Philadelphia and Reading Railroad, and between Station O and Union Traction Company.

Route 410007 between Station Q and Union Traction Company.

Route 210598 between Station J and Union Traction Company.

Amount saved for the above per annum \$8,277

In the event of the extension of the pneumatic-tube service as proposed, the discontinuance of the electric street-car service and wagon service as given above, it is proposed to send mail for Station I and Station Z by railroad, establishing messenger service at those stations same as before trolley service was introduced; reestablish wagon service between Philadelphia and Reading Railroad and Station I (former contract)

\$600

Also wagon service between Philadelphia and Reading Railroad and Station Z (former contract)

120

The new service which would have to be provided to connect the stations for the transportation of mail matter which could not go through the tube, and the probable cost of this service would be: To stations having five deliveries, five trips of wagon service; and to stations having three deliveries, three trips of wagon service.

Service between Station B and Station U (Paschallville) to be performed by messenger making nine round trips per day, starting from Station B at 6 a. m. and ending at Station B 8 p. m.

Estimated cost of this service..... 6,500

7,220

Estimated net reduction in wagon service 1,057

30. Should additional postage be collected for first-class matter transmitted through tubes?

I would recommend that no additional postage be charged for first-class matter other than that which should be exacted for special or immediate delivery letters. I would rather consider the advisability of giving special attention to increasing the special-delivery service, and possibly consider the propriety of adopting a special-delivery system for the handling of small merchandise packages on the basis of the immediate-delivery service. It would also be worth while considering the propriety of a special rate for the immediate forwarding and delivery of local mail between those stations connected with the central post-office by the pneumatic-tube service.

31. What might it cost the Government to acquire the existing plant and necessary patents now in use in the Philadelphia service?

The Department can answer this question better than I can, as they can practically make their own terms with the owners of the plant, and, comparatively speaking, it will have little intrinsic value for mail purposes if the Government terminates its contract.

32. The wisdom of requesting Pneumatic Transit Company to submit estimate as to the lowest cost of installing and operating the several circuits outlined in proposition.

I doubt very much the wisdom of asking the Pneumatic Transit Company or any other company to furnish reliable data or information to be used in a report which may be given to the public, and thus furnish to their competitors any reliable infor-

mation as to their estimates of the cost of installing and operating circuits for the pneumatic-tube system.

33. Are there any other companies or individuals who could be requested to furnish propositions?

I have no information on this subject that is of any value. I have no direct communication with any of the companies and no personal knowledge of how many companies or individuals there may be engaged in this line of business.

34. In connection with any such proposition, bear in mind present rates for highest class of service.

In considering this subject, the thought has never been lost sight of that the highest rate of efficiency must be obtained.

35. Give all facts you can bearing upon the use of the tubes in connection with the mail service and any data pertinent to the general investigation contemplated by Congress.

In compliance with this question would state that, in addition to the specific information contained in the foregoing, there will be found in the appendix, hereto attached, such data bearing upon the subject-matter of this report which, it is hoped, will be of value to the Department or to Congress in the consideration of the pneumatic-tube service. The appendix embraces tables of statistics referred to in the text of the report and designated by letters A to S, inclusive.

In addition to these tables there are included certain papers which it was thought well to add, as they not only convey information of some value on the subject, but contain the expressions and views of gentleman who, by reasons of associations and study, are in a position to furnish information worthy of consideration.

One paper from Thomas Martindale, esq., a prominent merchant and an active member of the Trades League. Mr. Martindale has given special consideration to the subject of the pneumatic-tube service.

Another from Finley Acker, esq., chairman of the postal committee of the Trades League of Philadelphia, who has also given much thought and study on the subject.

Another from Emil P. Albrecht, esq., secretary of the Philadelphia Bourse, transmitting an extract from the minutes of the board of directors of the Philadelphia Bourse, held October 10, 1900, containing a preamble and resolution unanimously adopted by the board with relation to the pneumatic-tube service.

Finally, a communication from William J. Kelly, esq., dated August 22, 1900. Mr. Kelly represents the Pneumatic Dispatch Tube Works, and submits for consideration a copy of the specifications used by the Batcheller Pneumatic Tube Company for bored cast-iron pneumatic tubes, specifications of the same company for bent brass tubes and fittings, and specifications of the Pneumatic Dispatch Tube Works for cast-iron pipe used for pneumatic-tube purposes.

PHILADELPHIA, October 31, 1900.

THOMAS L. HICKS, *Postmaster.*

TABLE A.—Table showing the comparative speed in time actually consumed between station and average rate per hour for wagon service, electric street-car service, and the pneumatic tube service.

Points of transmission.	Dis- tance.	Time in transit and speed.								
		By wagon.			By street cars.			By tube.		
		Min- utes.	Sec- onds.	Per hour.	Min- utes.	Sec- onds.	Per hour.	Min- utes.	Sec- onds.	Per hour.
	<i>Miles.</i>			<i>Miles.</i>			<i>Miles.</i>			<i>Miles.</i>
Central office to S.....	1.00	15	4.00	8	7.50	2	30			
From S to O.....	1.00	15	4.00	7	8.57	2	30			
From O to C.....	.66	15	2.64	12	3.30	1	19			
From C to J.....	1.00	15	4.00	8	7.50	2	30			
From J to central.....	1.66	20	4.98	13	7.65	3	19			
From central office to A.....	.78	15	3.12	8	5.85	1	33½			
From A to D.....	.91	15	3.64	6	9.10	1	49			
From D to P.....	.96	12	4.80	9	6.39	1	55			
From P to central.....	1.03	15	4.12	10	6.18	2	3			
From central office to B.....	2.37	30	4.74	18	7.90	4	34			
From S to K.....	1.79	20	5.37	16	6.71	3	34			
From K to E.....	1.39	20	4.17	10	8.34	2	47			
From E to F.....	1.90	20	5.70	13	8.74	3	48			
From O to Q.....	1.37	20	4.11	8	10.27	2	44			
From Q to R.....	1.60	20	4.80	7	13.71	3	12			
From R to G.....	2.36	25	5.64	16	8.85	4	44			

TABLE B.—Table showing the frequency of service between the general post-office and stations for week days and Sundays for wagon service, electric street-car service, and the pneumatic-tube service, given in trips per day.

Points of transmission.	Distance.	By wagon (daily trips).		By street cars (daily trips).		By tube (daily trips).	
		Week days.	Sundays.	Week days.	Sundays.	Week days.	Sundays.
	<i>Miles.</i>						
From central to S	1.00	29	10	22	7	150	60
From S to O	1.00	9	1	22	7	80	40
From O to C .....	.66	7				80	40
From C to J	1.00	20	8	19	7	80	40
From J to central	1.66	20	8	19	7	150	60
From central to A .....	.78	21	5	19	6	150	60
From A to D .....	.91	19	5	19	7	80	40
From D to P .....	.96	5		19	7	80	40
From P to central	1.03	20	8	19	7	150	60
From central to B	2.37	18	5	19	6	150	60
From S to K	1.79	20	8	18	5	60	30
From K to E	1.39	14	2	18	5	60	30
From E to F	1.90	3		18	5	60	30
From O to Q	1.37	21	6	18	6	60	30
From Q to R	1.60	1		18	6	60	30
From R to G	2.36	6		18	6	60	30

TABLE C.—Table showing the quantity of mail transmitted by the present 8-inch pneumatic-tube service, between the central post-office and the Pennsylvania and Reading Railroad stations, and designating the daily average number of carriers sent from one point to another and the average number of pieces of mail per carrier, this being the daily average from careful records.

Service.	Number of pieces first-class mail transmitted.	Number of pieces other classes transmitted.	Number of carriers.	Number of pieces, first-class, per carrier.	Number of pieces, other classes, per carrier.
From central post-office to Pennsylvania Station	401,242	7,552	1,877	213	4
From Pennsylvania Station to central post-office	266,579	19,424	1,877	142	10
From central post-office to Reading Terminal	41,349	6,080	893	46	7
From Reading Terminal to central post-office	37,218	5,280	893	42	6
From Pennsylvania Station to Reading Terminal	27,130	1,720	173	157	10
From Reading Terminal to Pennsylvania Station	52,473	3,336	173	303	19

TABLE D.—Table showing the daily average number of letters and pounds of paper mail dispatched to and received from the Broad Street Station, Pennsylvania Railroad, and the Reading Terminal Station, also the amount handled between the two railway stations by pneumatic-tube and wagon service at the Philadelphia post-office.

Items.	Broad Street Station, Pennsylvania Railroad.		Pennsylvania and Reading Terminal Station.		Broad Street Station and Reading Terminal.		Totals.	
	Number of letters handled.	Papers handled.	Number of letters handled.	Papers handled.	Number of letters handled.	Papers handled.	Number of letters handled.	Papers handled.
		<i>Pounds.</i>		<i>Pounds.</i>		<i>Pounds.</i>		<i>Pounds.</i>
Daily average number of letters dispatched through tube.....	401,242	944	41,349	760	27,130	215	469,721	1,919
Daily average number of letters dispatched by wagons.....	50,054	48,680	26,517	5,555	.....	.....	76,571	54,235
Total average number of letters dispatched daily.....	451,296	49,624	67,866	6,315	.....	.....	546,292	56,154
Daily average number of letters received by tube....	266,579	2,428	37,218	660	52,473	417	356,270	3,505
Daily average number of letters received by wagons.....	13,103	18,273	1,434	1,128	.....	.....	14,537	19,401
Total average number of letters received daily.....	279,682	20,701	38,652	1,788	.....	.....	370,807	22,906
Total daily average letters handled.....	730,978	70,325	106,518	8,103	79,603	632	917,099	79,060

TABLE E.—Table showing the volume of business transacted and mail matter handled at the central post-office and the several principal stations to which it has been proposed to extend the pneumatic-tube service.

[The stations are arranged by groups, in the order of their importance.]

Station.	Postal receipts for year ending June 30, 1900.	Number of collections.		First-class pieces collected week days.	First-class pieces from drop.	Number of deliveries.		First-class pieces delivered daily.	Special-delivery pieces delivered year ending June 30, 1900.
		Week days.	Sundays.			Week days.	Sundays.		
Central.....	\$1,153,021.60	16	4	279,669	50,133	7	a2	262,405	220,717
S.....	67,028.17	9	3	30,823	3,000	5 to 7	.....	27,362	3,865
O.....	38,507.37	9	3	19,000	1,500	5	.....	24,500	3,342
C.....	43,550.59	8 to 9	3	45,122	4,000	4 to 5	.....	72,504	7,793
J.....	40,985.24	9	3	33,265	2,000	5	.....	29,027	3,601
Total.....	190,071.37	.....	.....	128,210	10,500	.....	.....	153,893	18,606
A.....	111,244.89	11 to 16	3	46,541	6,000	5 to 7	a2	37,713	11,707
D.....	34,402.15	2 to 8	1 to 3	19,937	2,000	2 to 5	.....	29,906	2,613
P.....	41,618.50	2 to 9	1 to 3	16,219	2,000	2 to 5	.....	30,029	2,651
Total.....	187,265.54	.....	.....	82,697	10,000	.....	.....	97,648	16,971
B.....	53,569.87	3 to 9	1 to 3	30,944	5,000	2 to 5	.....	37,118	29,710
K.....	39,662.78	9	3	9,806	1,000	5	.....	12,602	1,041
E.....	15,066.30	3 to 8	1 to 3	5,200	900	2 to 5	.....	15,911	2,435
F.....	25,963.27	3 to 8	1 to 3	5,164	1,000	2 to 4	.....	6,590	2,685
Total.....	80,692.35	.....	.....	20,170	2,900	.....	.....	35,103	6,161
Q.....	44,757.18	3 to 9	3	8,586	2,000	3 to 5	.....	23,632	1,911
R.....	16,553.60	4 to 8	2 to 3	4,793	500	2 to 4	.....	7,668	4,948
G.....	51,355.43	3 to 7	1 to 3	8,499	1,500	2 to 4	.....	13,968	14,012
Total.....	112,666.21	.....	.....	21,878	4,000	.....	.....	45,268	20,871
Grand total....	1,777,286.94	.....	.....	563,568	82,533	.....	.....	630,935	313,036

a Hotels and club houses only.

TABLE F.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and stations A, D, and P, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

STATION A.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	21,945	7,299	3,406	627	33,277	25,324	127	641	164	26,256	46	32
Sept. 18.....	23,761	6,603	1,347	568	32,279	28,109	589	1,638	204	30,540	48	34
Sept. 20.....	25,328	9,352	3,252	1,004	38,936	30,264	921	1,940	119	33,244	84	54
Sept. 24.....	23,816	6,008	1,680	553	32,057	25,804	.....	3,225	310	29,339	50	43
Total.....	94,850	29,262	9,685	2,752	136,549	109,501	1,637	7,444	797	119,379	228	163
Average....	23,712	7,316	2,421	688	34,137	27,375	409	1,861	199	29,844	57	41

STATION D.

Sept. 13.....	12,643	6,881	3,140	545	23,209	13,614	80	15,440	177	29,311	23	13
Sept. 18.....	14,356	2,848	677	300	18,181	13,876	216	238	65	14,395	23	5
Sept. 20.....	16,061	6,034	2,464	628	25,187	11,816	371	975	80	13,242	15	7
Sept. 24.....	14,246	3,676	3,676	351	21,949	12,320	85	1,040	57	13,502	23	5
Total.....	57,306	19,439	9,957	1,824	88,526	51,626	752	17,693	379	70,450	84	30
Average....	14,327	4,859	2,489	456	22,131	12,906	188	4,423	95	17,612	21	8

STATION P.

Sept. 13.....	18,453	5,541	2,588	660	27,242	16,507	89	2,520	78	19,194	20	9
Sept. 18.....	18,728	3,631	692	436	23,487	16,135	231	4,733	99	21,198	27	3
Sept. 20.....	20,488	5,935	2,453	549	29,425	11,757	350	204	61	12,372	30	26
Sept. 24.....	20,200	4,053	1,430	340	26,023	11,234	30	783	146	12,193	17	16
Total.....	77,869	19,160	7,163	1,985	106,177	55,633	700	8,240	384	64,957	94	54
Average....	19,467	4,790	1,791	496	26,544	13,908	175	2,060	96	16,239	23	13
Grand total.	230,025	67,861	26,805	6,561	331,252	216,760	3,089	33,377	1,560	254,786	406	247
Grand average.....	57,506	16,965	6,701	1,640	82,812	54,190	772	8,344	390	63,695	101	62

TABLE G.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Stations S, O, C, and J, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

STATION S.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	19,350	4,791	2,738	800	27,679	20,463	165	470	342	21,440	36	5
Sept. 18.....	16,363	3,119	629	329	20,440	19,631	136	402	283	20,452	36	24
Sept. 20.....	19,622	5,035	2,317	580	27,554	18,835	487	1,751	129	21,202	28	22
Sept. 24.....	15,442	3,632	1,282	303	20,659	17,229	152	2,092	331	19,804	100	27
Total.....	70,777	16,577	6,966	2,012	96,332	76,158	940	4,715	1,085	82,898	200	78
Average....	17,694	4,144	1,742	503	24,083	19,039	235	1,179	271	20,724	50	20

TABLE G.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Stations S, O, C, and J—Continued.

STATION O.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	13,668	4,776	2,841	543	21,828	9,790	127	253	118	10,288	11	6
Sept. 18.....	13,861	2,744	607	239	17,451	8,115	248	163	79	8,605	23	3
Sept. 20.....	14,535	4,479	1,811	422	21,247	11,164	362	149	58	11,733	16	13
Sept. 24.....	13,764	3,693	1,278	309	19,044	12,821	364	375	47	13,607	7	6
Total.....	55,828	15,692	6,537	1,513	79,570	41,890	1,101	940	302	44,233	57	28
Average.....	13,957	3,923	1,634	378	19,892	10,473	275	235	75	11,058	14	7

STATION C.

Sept. 13.....	20,185	4,587	5,101	649	30,522	17,088	463	182	132	17,865	17	12
Sept. 18.....	25,851	4,921	1,024	443	32,239	16,404	665	319	203	17,591	38	21
Sept. 20.....	24,338	9,080	3,288	881	37,587	18,875	724	361	172	20,132	35	29
Sept. 24.....	25,823	6,064	1,525	518	33,930	21,261	.....	1,235	71	22,567	3	3
Total.....	96,197	24,652	10,938	2,491	134,278	73,628	1,852	2,097	578	78,155	93	65
Average.....	24,049	6,163	2,734	623	33,569	18,407	463	524	144	19,538	23	16

STATION J.

Sept. 13.....	11,303	5,165	1,916	798	19,182	10,205	82	166	90	10,543	11	8
Sept. 18.....	13,611	2,347	511	271	16,740	10,952	207	207	51	11,417	17	5
Sept. 20.....	13,503	5,195	1,719	486	20,903	11,241	565	195	73	12,074	21	14
Sept. 24.....	12,062	3,563	903	297	16,825	10,414	65	734	80	11,293	5	2
Total.....	50,479	16,270	5,049	1,852	73,650	42,812	919	1,302	294	45,327	54	29
Average.....	12,620	4,067	1,262	463	18,412	10,703	230	326	73	11,332	14	7
Grand total.	273,281	73,191	29,490	7,868	383,830	234,488	4,812	9,054	2,259	250,613	404	200
Grand average.....	68,320	18,297	7,372	1,967	95,956	58,622	1,203	2,263	564	62,652	101	50

TABLE H.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Station B, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

STATION B.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	17,380	7,966	3,411	832	29,589	15,275	1,440	2,215	411	19,341	12	11
Sept. 18.....	22,685	5,219	994	477	29,375	17,272	751	536	135	18,694	41	6
Sept. 20.....	23,761	8,831	3,054	16	35,662	17,436	662	1,261	170	19,529	43	25
Sept. 24.....	25,042	8,757	2,470	578	36,847	19,937	114	717	84	20,852	5	2
Total.....	88,868	30,778	9,923	1,903	131,473	69,920	2,967	4,729	800	78,416	101	44
Average.....	22,217	7,693	2,482	476	32,868	17,480	742	1,182	200	19,604	25	11

TABLE I.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Stations K, E, and F, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

STATION K.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	9,708	3,439	1,787	228	15,162	8,252	47	129	65	8,493	4	2
Sept. 18.....	8,361	2,067	402	203	11,033	5,771	83	115	42	6,011	15	4
Sept. 20.....	8,828	3,076	1,469	326	13,699	6,888	126	233	69	7,316	19	13
Sept. 24.....	7,563	1,876	850	167	10,456	6,661	278	299	99	7,337	6	2
Total.....	34,460	10,458	4,508	924	50,350	27,572	534	776	275	29,157	44	21
Average.....	8,615	2,614	1,127	231	12,587	6,893	133	194	69	7,289	11	5

STATION E.

Sept. 13.....	4,483	2,606	919	197	8,205	21,174	77	68	60	21,379	10	6
Sept. 18.....	3,505	1,289	286	129	5,209	3,029	115	28	14	3,186	.....	.....
Sept. 20.....	4,898	1,833	770	175	7,171	2,579	386	1,206	46	4,217	7	5
Sept. 24.....	3,878	1,164	635	92	5,769	3,031	32	348	19	3,430	1	1
Total.....	16,259	6,892	2,610	593	26,354	29,813	610	1,650	139	32,212	18	11
Average.....	4,065	1,723	652	148	6,588	7,453	152	413	35	8,053	5	3

STATION F.

Sept. 13.....	4,483	2,388	1,061	239	8,171	3,379	71	110	59	3,619	3	3
Sept. 18.....	4,209	1,395	338	156	6,098	3,827	81	117	215	4,240	12	6
Sept. 20.....	4,923	2,157	888	227	8,195	3,359	236	122	384	4,101	12	9
Sept. 24.....	3,768	1,175	581	67	5,591	3,500	578	432	96	4,606	2	2
Total.....	17,383	7,115	2,868	689	28,055	14,065	966	781	754	16,566	29	20
Average.....	4,346	1,779	717	172	7,014	3,516	241	195	189	4,141	7	5
Grand total.	68,102	24,465	9,986	2,206	104,759	71,450	2,110	3,207	1,168	77,935	91	62
Grand average.....	17,026	6,116	2,496	551	26,189	17,862	527	802	292	19,483	23	13

TABLE J.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Stations Q, R, and G, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

STATION Q.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	10,203	3,307	2,358	598	16,466	10,650	49	89	54	10,842	8	4
Sept. 18.....	11,496	2,234	866	188	14,284	11,089	263	403	156	11,911	33	19
Sept. 20.....	12,320	5,069	1,429	525	19,343	14,193	85	4,720	79	19,077	33	21
Sept. 24.....	9,763	2,851	985	286	13,885	10,860	3,719	5,640	230	20,449	16	12
Total.....	43,782	13,461	5,138	1,597	63,978	46,792	4,116	10,852	519	62,279	90	56
Average.....	10,945	3,365	1,285	399	15,994	11,698	1,029	2,713	129	15,569	23	14

TABLE J.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Stations Q, R, and G, etc.—Continued.

STATION R.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	4, 208	2, 011	929	231	7, 379	5, 529	56	82	67	5, 734	7	6
Sept. 18.....	4, 429	1, 038	263	143	5, 873	3, 674	83	233	49	4, 039	5	4
Sept. 20.....	5, 041	2, 518	839	256	8, 654	2, 978	146	96	48	3, 268	9	8
Sept. 24.....	4, 533	1, 645	433	141	6, 752	4, 224	888	244	79	5, 435	4	3
Total.....	18, 211	7, 212	2, 464	771	28, 658	16, 405	1, 173	655	243	18, 476	25	21
Average.....	4, 553	1, 803	616	193	7, 165	4, 101	293	164	61	4, 619	6	5

STATION G.

Sept. 13.....	9, 434	3, 036	2, 072	248	14, 790	2, 944	1, 933	647	200	5, 724	6	4
Sept. 18.....	8, 911	2, 388	468	222	11, 989	7, 933	145	2, 563	98	10, 739	18	6
Sept. 20.....	12, 293	4, 811	3, 056	517	20, 677	6, 954	472	207	67	7, 700	11	7
Sept. 24.....	12, 304	3, 452	829	242	16, 827	8, 866	342	289	134	9, 631	7	5
Total.....	42, 942	13, 687	6, 425	1, 229	64, 283	26, 697	2, 892	3, 706	499	33, 794	42	22
Average.....	10, 735	3, 422	1, 606	307	16, 070	6, 674	723	926	125	8, 448	10	6
Grand total	104, 935	34, 360	14, 027	3, 597	156, 919	89, 894	8, 181	15, 213	1, 261	114, 549	157	99
Grand average	26, 233	8, 590	3, 507	899	39, 229	22, 473	2, 045	3, 803	315	28, 636	39	24

TABLE K.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Broad Street Station, Pennsylvania Railroad, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

BROAD STREET STATION.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	449, 940	1, 580	63, 345	253	515, 118	290, 910	5, 890	5, 884	1, 114	303, 798	24	17
Sept. 18.....	375, 774	772	14, 035	131	390, 712	307, 050	10, 746	3, 634	1, 383	322, 813	152	121
Sept. 20.....	455, 386	2, 553	5, 001	258	463, 198	290, 580	18, 792	4, 573	2, 146	316, 091	140	120
Sept. 24.....	320, 737	1, 258	948	83	323, 026	208, 640	13, 558	3, 609	1, 468	227, 275	45	32
Total.....	1, 601, 837	6, 163	83, 329	725	1, 692, 054	1, 097, 180	48, 986	17, 700	6, 111	1, 169, 977	361	290
Average.....	400, 459	1, 541	20, 832	181	423, 013	274, 295	12, 246	4, 425	1, 528	292, 494	90	72

TABLE L.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and Philadelphia and Reading Terminal, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

READING TERMINAL.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	44,260	1,123	4,698	197	50,278	38,550	4,918	5,599	576	49,643	35	14
Sept. 18.....	37,315	2,903	2,282	216	42,716	37,535	5,279	7,007	422	50,243	34	12
Sept. 20.....	34,677	1,987	1,627	305	38,596	36,083	3,759	876	313	41,031	17	11
Sept. 24.....	42,735	996	818	128	44,677	30,129	1,553	1,298	233	33,213	55	38
Total.....	158,987	7,009	9,425	846	176,267	142,297	15,509	14,780	1,544	174,130	141	75
Average.....	39,747	1,752	2,356	211	44,067	35,574	3,877	3,695	386	43,532	35	19

TABLE M.—Table compiled from a careful count, showing the volume of mail (by classes) passing between the central post-office and the Philadelphia Bourse, and also showing the number of pieces too large to be handled by 6-inch or 8-inch tube service.

BOURSE.

Date.	Pieces dispatched.					Pieces received					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	6-inch tube.	8-inch tube.
1900.												
Sept. 13.....	4,020	000	323	96	4,339	68,858	0,000	21,313	446	90,617	311	134
Sept. 18.....	3,484	639	1,263	200	5,586	67,932	0,000	11,953	707	80,592	2,657	166
Sept. 20.....	3,921	984	482	248	5,635	66,499	0,000	20,993	839	88,331	2,170	299
Sept. 24.....	5,318	827	336	154	6,635	65,474	0,000	10,011	583	76,068	2,237	286
Total.....	16,743	2,450	2,904	698	22,795	268,763	0,000	64,270	2,575	335,608	7,375	885
Average.....	4,186	612	726	175	5,699	67,191	0,000	16,067	644	83,902	1,844	221

TABLE N.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations A, D, and P, designating the number of pieces too large to be handled through 6-inch or 8-inch pneumatic-tube service.

STATION A.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	27,738	.....	10,022	2,485	40,245	45,065	6,287	912	377	52,641	15	6
Sept. 11.....	28,283	.....	8,295	2,366	38,944	41,504	9,877	907	301	52,589	18	15
Sept. 13.....	46,140	.....	6,726	1,023	53,889	43,081	4,768	1,633	582	50,064	9	2
Sept. 18.....	32,841	.....	5,860	363	39,064	30,810	2,837	887	234	34,768	15	15
Sept. 20.....	48,945	.....	11,747	1,210	61,902	32,058	3,411	891	224	36,584	3	1
Sept. 24.....	34,831	.....	1,774	775	37,380	28,940	2,471	616	151	32,178	15	12
Total.....	218,778	.....	44,424	8,222	271,424	221,458	29,651	5,846	1,869	258,824	75	51
Average.....	36,463	.....	7,404	1,370	45,237	36,909	4,942	974	312	43,137	12	8

TABLE N.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations A, D, and P, etc.—Continued.

STATION D.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	15,696	.....	4,838	1,721	22,255	27,785	4,871	3,100	591	36,347	363	34
Sept. 11.....	15,434	.....	2,481	789	18,704	25,281	3,202	2,532	751	31,766	122	10
Sept. 13.....	14,735	.....	10,691	328	25,754	21,475	3,402	2,262	787	27,926	57	11
Sept. 18.....	17,132	.....	3,513	718	21,363	26,771	2,868	1,673	619	31,931	33	10
Sept. 20.....	18,225	.....	3,261	1,531	23,017	28,234	4,548	2,461	750	35,993	17	7
Sept. 24.....	17,599	.....	4,724	329	22,652	32,759	1,681	4,716	318	39,474	9	3
Total.....	98,821	.....	29,508	5,416	133,745	162,305	20,572	16,744	3,816	203,437	601	75
Average.....	16,470	.....	4,918	903	22,291	27,051	3,429	2,791	636	33,907	100	12

STATION P.

Sept. 6.....	29,887	.....	5,229	750	35,866	43,518	5,923	274	191	49,906	38	32
Sept. 11.....	33,369	.....	10,224	799	44,392	35,301	7,795	657	615	44,368	149	129
Sept. 13.....	24,806	.....	5,274	134	30,214	29,335	3,909	553	251	34,048	42	28
Sept. 18.....	24,353	.....	7,626	297	32,276	33,155	3,060	1,242	1,771	39,228	26	16
Sept. 20.....	22,995	.....	1,195	54	24,244	35,707	3,474	2,883	2,268	44,332	16	12
Sept. 24.....	19,646	.....	1,426	182	21,254	25,949	3,336	974	667	30,926	55	38
Total.....	155,056	.....	30,974	2,216	188,246	202,965	27,497	6,583	5,763	242,808	326	255
Average.....	25,843	.....	5,162	369	31,374	33,828	4,583	1,097	960	40,468	54	43
Grand total	472,655	.....	104,906	15,854	593,415	586,728	77,720	29,173	11,448	705,069	1,002	381
Grand average.....	78,776	.....	17,484	2,642	98,902	97,788	12,954	4,862	1,908	117,512	166	63

TABLE O.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations S, O, C, and J, designating the number of pieces too large to be handled through 6-inch or 8-inch pneumatic-tube service.

STATION S.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	30,057	.....	3,090	274	33,421	31,451	8,763	782	348	41,344	31	30
Sept. 11.....	32,779	.....	3,698	439	36,916	28,897	9,227	522	275	38,921	11	5
Sept. 13.....	30,421	.....	2,126	587	33,134	28,987	5,872	1,597	327	36,783	74	40
Sept. 18.....	33,879	.....	4,197	387	38,463	29,165	6,127	1,260	465	37,017	84	36
Sept. 20.....	30,851	.....	5,287	243	36,381	30,419	6,227	1,657	1,085	39,388	15	7
Sept. 24.....	31,837	.....	3,252	467	35,556	32,786	9,728	1,221	372	44,107	130	77
Total.....	189,824	.....	21,650	2,397	213,871	181,705	45,944	7,039	2,872	237,560	345	195
Average.....	31,638	.....	3,608	399	35,645	30,284	7,657	1,173	479	39,593	57	32

TABLE O.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations S, O, C, and J, etc.—Continued.

STATION O.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	19,958	.....	1,640	795	22,393	25,809	4,273	5,244	1,108	36,434	37	29
Sept. 11.....	21,374	.....	2,644	611	24,629	25,524	4,413	4,274	1,092	35,303	58	38
Sept. 13.....	22,125	.....	1,990	364	24,479	25,905	4,783	4,281	917	35,886	128	74
Sept. 18.....	22,139	.....	2,704	773	25,616	25,692	3,570	5,421	1,346	36,029	107	51
Sept. 20.....	22,717	.....	2,482	524	25,723	26,978	5,551	5,004	1,468	39,001	146	72
Sept. 24.....	27,888	.....	2,532	505	30,925	26,600	2,338	6,832	1,358	37,128	133	60
Total.....	136,201	.....	13,992	3,572	153,765	156,508	24,928	31,056	7,289	219,781	604	32
Average.....	22,700	.....	2,332	595	25,627	26,085	4,154	5,176	1,215	36,630	101	5

STATION C.

Sept. 6.....	27,543	.....	2,886	116	30,545	44,561	6,433	118	56	51,168	526	9
Sept. 11.....	29,435	.....	2,534	112	32,081	43,294	8,315	104	65	51,778	407	4
Sept. 13.....	26,946	.....	2,318	96	29,360	42,780	7,968	166	32	50,946	298	3
Sept. 18.....	27,841	.....	2,201	84	30,126	44,433	8,104	145	27	52,709	271	7
Sept. 20.....	29,130	.....	2,559	63	31,752	46,270	7,820	132	31	54,253	258	.....
Sept. 24.....	36,060	.....	647	2,556	39,263	48,311	7,600	973	770	57,654	43	19
Total.....	176,955	.....	13,145	3,027	193,127	269,649	46,240	1,638	981	318,508	1,803	42
Average.....	29,492	.....	2,191	504	32,187	44,942	7,706	273	163	53,084	300	7

STATION J.

Sept. 6.....	15,730	.....	5,615	153	21,498	23,025	6,534	2,587	212	32,358	1,804	5
Sept. 11.....	19,771	.....	3,789	153	23,713	19,420	4,515	2,021	124	26,080	28	8
Sept. 13.....	20,858	.....	4,189	187	25,234	19,064	7,056	2,002	180	28,302	337	5
Sept. 18.....	24,130	.....	1,828	126	26,084	21,857	8,133	1,209	157	31,356	27	10
Sept. 20.....	22,216	.....	3,145	310	25,671	21,132	7,187	2,723	361	31,403	39	21
Sept. 24.....	25,276	.....	7,193	142	32,611	26,690	6,931	3,673	256	37,550	22	13
Total.....	127,981	.....	25,759	1,071	154,811	131,188	40,356	14,215	1,290	187,049	2,257	62
Average.....	21,330	.....	4,293	178	25,801	21,864	6,726	2,369	215	31,174	376	10
Grand total..	630,961	.....	74,546	10,067	715,574	739,050	157,468	44,948	12,432	962,898	5,009	623
Grand average.....	105,160	.....	12,424	1,676	119,260	123,175	26,243	7,491	2,072	160,481	834	103

TABLE P.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Station B, designating the number of pieces too large to be handled through 6-inch or 8-inch pneumatic-tube service.

STATION B.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	26,536	1,772	149	614	29,071	30,024	6,712	291	114	37,141	15	14
Sept. 11.....	25,415	1,912	31	51	27,409	31,395	2,564	312	41	34,312	23	20
Sept. 13.....	23,621	1,783	466	412	26,282	27,605	4,248	2,005	207	34,065	30	27
Sept. 18.....	24,423	493	2,083	298	27,297	28,494	1,686	2,254	227	32,661	43	22
Sept. 20.....	27,121	101	3,268	194	30,684	24,846	4,064	4,521	181	33,612	45	29
Sept. 24.....	25,682	123	1,638	84	27,527	28,990	2,034	5,258	113	36,395	1,203	21
Total.....	152,798	6,184	7,635	1,653	168,270	171,354	21,308	14,641	883	208,186	1,359	133
Average....	25,466	1,031	1,273	275	28,045	28,559	3,551	2,440	147	34,697	226	22

TABLE Q.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations K, E, and F designating the number of pieces too large to be handled through 6-inch or 8-inch pneumatic-tube service.

STATION K.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	9,886	.....	635	169	10,690	14,410	2,103	1,182	176	17,871	268	253
Sept. 11.....	9,176	.....	1,260	588	11,024	13,171	1,139	696	120	15,126	42	16
Sept. 13.....	7,694	88	2,238	73	10,093	9,486	1,743	692	46	11,967	9	9
Sept. 18.....	9,159	44	2,499	17	11,719	10,539	578	870	158	12,145	34	27
Sept. 20.....	8,296	72	949	25	9,342	11,963	1,575	2,135	52	15,725	20	14
Sept. 24.....	9,067	133	543	43	9,786	10,354	802	626	102	11,884	4	3
Total.....	53,278	337	8,124	915	62,654	69,923	7,940	6,201	654	84,718	377	322
Average....	8,880	56	1,354	152	10,442	11,654	1,323	1,033	109	14,119	63	54

STATION E.

Sept. 6.....	5,720	.....	453	72	6,245	10,112	3,173	81	219	13,585	26	7
Sept. 11.....	5,697	.....	1,258	112	7,067	10,197	2,993	198	312	13,700	42	30
Sept. 13.....	5,827	.....	907	172	6,906	11,209	3,371	212	301	15,093	45	15
Sept. 18.....	5,933	.....	643	198	6,774	11,617	3,110	191	218	15,136	22	5
Sept. 20.....	10,212	.....	4,576	206	14,994	5,046	191	20,211	92	25,540	20	10
Sept. 24.....	4,319	.....	476	95	4,890	4,827	315	916	239	6,297	4	2
Total.....	37,708	.....	8,313	855	46,876	53,008	13,153	21,809	1,381	89,351	159	69
Average....	6,285	.....	1,385	142	7,812	8,834	2,192	3,635	230	14,891	26	11

TABLE Q.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations K, E, and F, etc.—Continued.

STATION F.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	4,095	55	65	197	4,412	5,101	484	765	199	6,913	6	2
Sept. 11.....	5,066	49	214	511	5,840	5,309	688	409	147	6,553	3	.....
Sept. 13.....	3,397	58	92	48	3,595	3,990	1,429	832	139	6,390	8	5
Sept. 18.....	3,177	.....	30	235	3,442	4,143	792	490	117	5,542	18	11
Sept. 20.....	3,047	.....	370	372	3,789	4,776	1,211	995	143	7,125	21	9
Sept. 24.....	4,421	.....	409	27	4,857	2,093	372	853	27	3,345	.....	.....
Total.....	23,203	162	1,180	1,390	25,935	25,412	5,340	4,344	772	35,868	56	27
Average.....	3,867	27	197	232	4,323	4,235	890	724	129	5,978	9	4
Grand total	114,189	499	17,617	3,160	135,465	148,343	26,433	32,354	2,807	209,937	592	418
Grand average.....	19,032	83	2,936	526	22,577	24,723	4,405	5,392	468	34,988	98	69

TABLE R.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations Q, R, and G, designating the number of pieces too large to be handled through 6-inch or 8-inch pneumatic-tube service.

STATION Q.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	20,927	.....	4,872	191	25,990	21,746	3,182	2,718	254	27,900	284	261
Sept. 11.....	11,509	170	3,470	728	15,877	21,705	1,317	2,610	1,569	27,201	25	18
Sept. 13.....	16,690	310	4,585	498	22,083	21,765	650	720	365	23,500	57	24
Sept. 18.....	10,675	250	2,718	565	14,208	20,760	816	3,915	940	26,431	59	47
Sept. 20.....	12,506	590	6,910	834	20,840	24,379	435	5,507	1,558	31,879	48	23
Sept. 24.....	11,521	.....	8,762	160	20,443	24,160	450	5,910	2,550	30,770	29	35
Total.....	83,828	1,320	31,317	2,976	119,441	134,515	6,850	21,380	4,936	167,681	502	408
Average.....	13,971	220	5,219	496	19,906	22,419	1,141	3,563	823	27,946	83	68

STATION R.

Sept. 6.....	6,433	263	146	136	6,978	6,071	1,842	283	240	8,436	2	2
Sept. 11.....	5,638	190	651	197	6,676	7,168	1,174	501	143	8,986	1	.....
Sept. 13.....	5,080	221	377	70	5,748	5,311	1,418	475	66	7,270	15	12
Sept. 18.....	6,445	256	262	110	7,073	6,004	1,850	383	131	8,368	2	1
Sept. 20.....	6,789	200	367	53	7,409	6,550	2,229	634	108	9,521	2	2
Sept. 24.....	5,940	.....	400	35	6,375	5,469	826	1,355	122	7,772	3	3
Total.....	36,325	1,130	2,203	601	40,259	36,573	9,339	3,631	810	50,353	25	20
Average.....	6,054	188	367	100	6,709	6,096	1,556	605	135	8,392	4	3

TABLE R.—Table compiled from a careful count, showing quantity of mail (by classes) dispatched from and received at Stations Q, R, and G, etc.—Continued.

STATION G.

Date.	Pieces dispatched.					Pieces received.					Too large for—	
	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	First-class.	Second-class.	Third-class.	Fourth-class.	Total.	Six-inch tube.	Eight-inch tube.
1900.												
Sept. 6.....	8,362	983	846	154	10,345	9,539	2,400	1,306	279	13,524	67	55
Sept. 11.....	8,363	553	1,302	163	10,381	8,570	625	933	200	10,328	522	520
Sept. 13.....	7,088	3,124	1,088	120	11,420	8,658	2,328	1,232	345	12,563	103	88
Sept. 18.....	7,546	225	2,640	116	10,527	7,693	998	1,231	227	10,149	34	14
Sept. 20.....	8,196	848	939	128	10,111	9,485	1,724	2,427	394	14,030	70	51
Sept. 24.....	8,278	57	725	179	9,239	8,975	1,050	1,513	104	11,642	35	15
Total.....	47,833	5,790	7,540	860	62,023	52,920	9,125	8,642	1,549	72,236	831	743
Average.....	7,972	965	1,257	143	10,337	8,820	1,521	1,440	258	12,039	138	124
Grand total.	167,986	8,240	41,060	4,437	221,723	224,008	25,314	33,653	7,295	290,270	1,358	1,171
Grand average.....	27,997	1,373	6,843	739	36,952	37,335	4,218	5,608	1,216	48,377	225	195

TABLE S.—Table showing a comparison between the month of August, 1899, and the same month for 1900, as to total number of carriers dispatched through the 8-inch tube, the average number of carriers dispatched daily, and the mileage traversed by carriers.

Line.	August, 1899.				August, 1900.			
	Total number of carriers dispatched.	Average number of carriers dispatched per day.	Total miles traversed.	Average miles traversed per day.	Total number of carriers dispatched.	Average number of carriers dispatched per day.	Total miles traversed.	Average miles traversed per day.
Broad street, east ...	23,261	862	18,921.36	700.79	54,473	2,018	44,311.00	1,641.20
Post-office to Broad street, west.....	23,261	862	18,948.10	701.80	54,473	2,018	44,373.00	1,643.40
Reading, east.....	7,821	290	2,632.24	97.49	20,186	748	6,793.65	251.62
Reading, west.....	2,550	95	1,215.60	45.22	4,530	168	2,159.47	79.98
Post-office to Reading, west.....	7,821	290	2,642.56	97.95	20,186	748	6,820.41	252.24
Broad street to Reading, east.....	2,550	95	1,215.60	45.22	4,530	168	2,159.47	79.98
Total.....	67,264	.....	45,575.46	.....	158,378	.....	106,617.00	.....

Each carrier traversed:

August, 1900 Miles per day.. 64
 August, 1899 do..... 27

Total number of carriers dispatched from post-office:

August, 1900 66,343
 August, 1899 27,668

Total increase..... 38,675

Per cent increase..... 140

Average number per day, 1900..... 2,457

Average number per day, 1899..... 1,025

PHILADELPHIA, August 25, 1900.

HON. THOMAS HICKS,

Postmaster.

MY DEAR SIR: I consider the application of pneumatic dispatch tubes between the railway terminals and the central post-office of inestimable value to the business communities of large cities, and to abolish it and go back to the old system of

horses and wagons for such transportation would be such a step backward as the substitution of the old "Dinky" or one-horse car for the sumptuous trolley car of the present day.

The celerity of movement of the carriers, the absolute safety of the mail matter which they carry, together with their ability to handle a large excess of mail without breaking down or becoming "stalled," as used to be a sometimes common occurrence in the old days, commend them to the judgment and regard of everyone who has become familiar with their ability. I confess that I am chagrined that our Government has not in this particular kept pace with England and other countries in the adoption of the system, not alone for short distances in large cities, but for the rapid transmission of mail between great centers of business and commerce. New York and Philadelphia, Philadelphia and Baltimore, with turn-outs for towns and villages en route might be easily connected together with this method of carrying the mails, together with express packages. It is a humiliation to know that excepting a letter addressed to a Philadelphia correspondent be actually in the New York office before 10.30 a. m. it will not be delivered in Philadelphia until the next day, and the same condition pertains to a letter mailed in Philadelphia for New York. Thus a joint population of 5,000,000 people is hampered in its communications by a slow mail service which ought to be the fastest and most up-to-date service in the whole world by reason of the magnitude and importance of the two cities.

With a pressure of 100 pounds upon such a line from New York to Philadelphia a speed of 93 miles an hour would be obtained. This would enable us to deliver mail before the close of business hours in Philadelphia that might be posted in New York up to say 4 p. m., and in fact as the carriers could be run practically in a continuous procession the delivery of their contents would be similarly continuous.

The tolls upon the express matter carried would make it a profitable scheme either for the Government to own or operate, or the Government might guarantee a rental sufficient to warrant the building of the system and let the owners carry express packages and make what revenue they could from the business.

Respectfully, yours,

THOMAS MARTINDALE.

PHILADELPHIA, August 27, 1900.

HON. THOMAS L. HICKS,
Postmaster.

MY DEAR SIR: Replying to your inquiry of the 24th instant, I beg to say that on April 25th I wrote the following letter:

"In company with several other gentlemen interested in postal matters, I recently witnessed the practical operation of the pneumatic-tube system at the Philadelphia post-office, the Reading Terminal, and the Pennsylvania Railroad. As a result of my observation, I have no hesitancy in expressing the belief that in large cities this system can be made as great an improvement over the wagon-delivery system as to justify its classification with such modern inventions as the telegraph and the telephone. By its use the mail is not only delivered between the post-office substations and the railroads in much less time than formerly, but it also permits the outgoing mails to remain open so much longer that considerable mail is sent on an earlier train than would be possible under the old system. But there is another important feature in connection with this system which must appeal to every practical business man. Inasmuch as the tubes are dispatched every few seconds, it means that the work of handling, casing, and pouching can go on continuously, thereby avoiding the congested conditions which are frequently associated with the dumping of wagon loads of mail at irregular intervals. After the pneumatic tube is thoroughly introduced I doubt if anyone would seriously consider going back to the slower method of wagon deliveries."

I will merely say at this time that I have had no occasion to change my opinion as expressed in the above letter, but am more firmly convinced than ever that the pneumatic-tube system is an up-to-date method which should be utilized in the post-offices of all our large cities.

Yours, very truly,

FINLEY ACKER.

PHILADELPHIA BOURSE,
Philadelphia, October 11, 1900.

HON. THOMAS L. HICKS,
Postmaster.

DEAR SIR: I have the honor to hand you herewith a certified copy of an extract from the minutes of a stated meeting of the board of directors of the Philadelphia

Bourse, held October 10, giving the preamble and resolution unanimously adopted in reference to the pneumatic-tube service, in response to your request of August 24, 1900.

Trusting the same may be of service to you and to the Post-Office Department, I am,
Very truly, yours,

EMIL P. ALBRECHT, *Secretary.*

[Extract from the minutes of a stated meeting of the board of directors of the Philadelphia Bourse held October 10, 1900.]

PNEUMATIC-TUBE SERVICE.

The following preamble and resolution was read and, on motion, unanimously adopted:

Whereas the usefulness of pneumatic tubes in connection with the transmission of mail matter between post-offices and railway terminals and between the main post-office and carrier stations in large cities is now being investigated by the Post-Office Department of the United States and—

Whereas the postmaster at Philadelphia is collecting such information upon this subject as can be gathered from all sources, and has expressed a desire to receive from the officers and directors of the bourse such expression of their opinion of the use of pneumatic tubes as a means of transmitting mail matter, whether relating to the "Batcheller" system now in use in this city or any other system which has been brought to their attention, as they may be willing to place officially on record; Therefore be it

Resolved, That the secretary of this company be directed to transmit to the postmaster of Philadelphia a certified copy of this preamble and resolution together with the following opinion:

We regard a system of pneumatic tubes as a valuable and desirable means for the transmission of mail matter between post-offices and railway terminals and between the main post-office and carrier stations in large cities, particularly in Philadelphia, where the locations of these various points are so related to one another as to permit the greatest amount of use to be made of such a system with a small amount of mileage of tubes.

We believe that the extension of a system of pneumatic tubes to connect the various carrier stations in Philadelphia with the main office according to the reports of the postmaster at Philadelphia to the honorable Second Assistant Postmaster-General under dates of October 19, 1898, and October 4, 1899, would be most desirable, and an efficacious means of continuous and prompt exchange of mail matter between these stations, effecting a saving of time; eliminating dangers of delay by fires, processions, riots, etc.; removing the danger of theft en route; making more prompt connections with other mails; preventing the possibility of the delay of an entire mail, and in many other ways securing a saving of labor or of time which is of the greatest importance.

EMIL P. ALBRECHT, *Secretary.*

PNEUMATIC DISPATCH TUBE WORKS,
Philadelphia, August 22, 1900.

HON. THOMAS L. HICKS,
Postmaster, Philadelphia, Pa.

DEAR SIR: Having been connected with the management and operation of the pneumatic tubes from their inception to the present time I feel entirely competent to give an opinion regarding their construction and operation that may be of some use to you in making your report to the Postmaster-General or to the commission whom he has appointed to make examination as to their utility and reliability.

First let me say that so confident were we of the successful operation of our system that when the Hon. John Wanamaker was Postmaster-General and was examining into the subject, we made an offer to the Government, and carried it out to the letter, to put a system in the post-office at Ninth and Chestnut streets, and continue it to the subpost-office then at 323 Chestnut street, but since removed to the Bourse, and operate it for one year at our own expense and if not found satisfactory at the end of that period, would take the system out and restore the buildings to their original condition, and we would pay for the same. This was brought about by reason of the

fact that in making inquiry throughout the United States he found that there were about eight or ten applicants for the privilege of renting to the Government systems that they called pneumatic dispatch systems.

We were satisfied from examination of their machinery that they could not perform the work satisfactorily. He, however, not being so well versed in the matter was in some doubt, and in order that there would be no question as to our confidence in our enterprise, we made the above offer and with the further stipulation to him that we had no objection to any other system being put in at the same time.

To say that we have established entire confidence in the Batcheller pneumatic tube system after the most severe tests that machinery can be put to, is to simply state a fact, and I think that the records of the Postal Department will show that I am stating what is exactly true in giving you the above facts.

The original system of 6-inch tubes which we put down under the above agreement taught us many valuable lessons, among which was quality of iron used for tubes, workmanship, etc., that would make the system like a gun barrel when completed; terminals that will receive and discharge without shock or friction, and in the second system of 8-inch tubes all of these were perfected to such an extent that their operation is simply marvelous.

I inclose you copies of specifications of the requirements of that system by the Batcheller Company in their manufacture; also of the brass bends and also of the raw pipe. These specifications will show you how necessary it is to be careful and accurate in the work and that necessity in our judgment is rendered absolute by reason of the fact that reliability in its operation is one of the greatest requirements of the pneumatic service.

I would take occasion to suggest that if any other system than the Batcheller should be put down they should in fairness be required to demonstrate as we did, at their own cost, that what they offer will answer the purpose, modifying the time perhaps to three months instead of twelve months.

I make this statement to you in perfect good faith, believing it to be fair to all parties, namely, the Government and the applicant, whoever they may be, and I am somewhat impelled to it by reason of the fact that in case a system should be put in and was a failure it would be an injury to our reputation, because of the public not being able to discriminate between one system and another.

In order to carry out the specifications submitted herewith an establishment had to be constructed, which is still in existence in this city, and if it would be at all desirable I would cheerfully go with you and let you see what it is in extent, fitness, and power to render service called for in the papers submitted to you herewith.

Trusting that this is not too long to give careful consideration to, and holding myself ready for any inquiry you should wish to make, I am

Yours, very sincerely,

WILLIAM J. KELLY.

[The Batcheller Pneumatic Tube Company.]

SPECIFICATIONS FOR BORED CAST IRON PNEUMATIC TUBE.

Description.—The tube is made of cast iron in pieces or lengths having a "bell" upon one end and at the other end machined to fit into a counter bore in the bottom of the bell of the adjoining piece. The counter bore is also machined. The tube is machined or bored upon the interior. The joints are made with lead and yarn by calking in the usual manner.

Special pieces of the tube which adjoins bends, elbows, or terminals will have a flange upon one end with a male projection, or a counter bore to correspond with flange of the bend, elbow, or terminal to which it attaches.

The accompanying drawing, Schedule A, shows the construction of the joints and the dimensions of the tube.

In the following specifications the engineer of the Batcheller Pneumatic Tube Company is referred to as the engineer and the person or persons manufacturing the tubes under the specifications to be referred to as the contractor.

Quality of metal.—The material, details of manufacture, and the testing of all special pipe and special castings herein referred to shall at all times be subject to the inspection and approval of the engineer. The metal, which must be remelted in the cupola or air furnace, shall be made without admixture or cinder iron or other inferior metal, and shall be of such character as to make a pipe strong, tough, and of sound, even grain, free from uncombined carbon when examined under the micro-

scope, and such as will satisfactorily bear drilling, chipping, and cutting. Its tensile strength and resilience when tested in proper samples shall meet all the requirements hereinafter expressed.

Specimen rods of the metal used, of a size and form suitable for a testing machine, shall be made and carefully tested to ascertain its tensile strength. Another set of test bars, each being 26 inches long, 2 inches wide, and 1 inch thick, shall be made as often as the engineer shall direct, and shall be tested both for transverse strength and deflection by placing them horizontally and flatwise upon supports 24 inches apart and then applying a steadily increasing load at the middle of each bar.

The bars for testing the transverse strength or resilience of the metal shall be cast from regular patterns in dry or green sand, and as near as possible to the required dimensions without being finished up; proper corrections will however be made in the results for slight variations of width and thickness. The rods for testing the tensile strength of the iron, on the other hand, must be turned down on a lathe in order to remove the rough exterior and enable the diameter to be accurately measured.

At least one set of four test bars of each kind above designated shall be made and tested as described on each working day of the manufacture of the pipe and specials when required by the engineer. These test bars must be poured from the ladle either before or after any particular pipe or special castings are poured, and must present true samples of the iron used in said pipes or castings. Records shall be kept of the tests of all bars made, and a duly certified record of such copy shall be forwarded to the engineer.

The quality of the metal used for the pipes and specials must be such that the bars for testing resilience as aforesaid shall each carry a center load of not less than 400 pounds, and exhibit a deflection of not less than five-sixteenths of an inch; also, the tensile strength of said metal shall be at least 17,000 per square inch as determined by the tests with the first named set of rods. In estimating the suitability of the metal from said tests, the average of the three highest results obtained from each set of four bars will be considered as representing the actual strength of the iron. All tests to be made at the expense of the contractor.

Manufacture of rough tubes.—All tubes shall be cast in dry sand molds vertically with the bell end up. Tubes shall not be taken from the pit while showing any color of heat, but shall be left in the flasks for a sufficient length of time to prevent the unequal cooling and contraction by subsequent exposure.

On being removed from the flasks all tubes shall be subjected to a careful examination and a hammer test for the purpose of detecting deflections of any kind. They shall then be thoroughly dressed and be made clean and free from dirt, sand, or dust which adheres to the iron in the molds. Iron wire brushes must be used as well as softer brushes to remove the loose dust. No acids shall be used in cleaning any of the castings.

After having been properly dressed and cleaned they shall again be subjected to a thorough inspection and hammer test. The contractor shall be required at the foundry to place all castings in such positions as may be deemed necessary by the engineer for convenience in inspection.

Coating.—Each tube shall be coated upon the exterior with an approved mixture of coal tar and linseed oil. There must be no coating upon the interior. The coating must be durable, smooth, hard, tough, glossy, waterproof, free from bubbles and blisters, strongly adhesive to the iron under all circumstances, and with no tendency to become soft enough to flow when exposed to the sun in summer, or to become so brittle as to scale off in the winter. As one test of the quality of the coating a properly coated specimen will be plunged into a freezing mixture and will be kept there until the metal has acquired the temperature of said mixture, after which the casting will be well hammered. If the coating remains tough and adhering closely to the metal it will be considered proper, provided it be satisfactory in all other respects. The coating of the tubes must be done in a manner satisfactory to the engineer.

Testing.—Every rough tube shall be subject to a proof by water pressure of 150 pounds per square inch. The tube while under the required pressure shall be sharply rapped from end to end with a hand hammer to ascertain whether any defects have been overlooked. Any tubes which may exhibit any defects by leaking, sweating, or otherwise shall be rejected.

All the above inspections, manipulations, and tests of the tubes and test bars shall be made at the expense of the contractor for the said tubes, said expense, however, not to include the salary of any inspector who may have been appointed by the Batcheller Pneumatic Tube Company. If required by the said company the affidavit of the superintendent of the foundry or that of the foreman employed by him to perform the above described testing shall also be furnished to the engineer from time to time, said affidavit to be recorded upon the tube inspector's sheets and stating in detail that the tubes or castings therein described have been carefully tested at

the foundry in accordance with these specifications and no defects were discovered or discoverable.

Marks.—Each and every tube shall bear a number cast in relief upon the outside and to be so distinct that no difficulty will be met in ascertaining it; and all defective tubes shall be identified by this number.

Machining.—All tubes shall be bored smooth except in the bell; a counterbore shall be made in the bottom of the bell and the male end shall be cut off square in a lathe and turned on the outside. There must be no chattering, tool marks, or unfinished spots on any finished surface. All dimensions are given in attached drawing marked Schedule A, and the limits of allowable variation are given below.

Dimensions.—The tube shall be cast in 12-foot running lengths and finished as long as possible. Any defect near the male end may have the defective portion cut off provided in so doing that the tubes are not less than 6 feet in length and provided that not more than 5 per cent of all the pieces shall be in length between 6 and 9 feet and 5 per cent between length of 9 feet and 11 feet 6 inches; the remaining 90 per cent must be more than 11 feet 6 inches.

The outside diameter of the tubes except at the bell and plain ends shall be 9½ inches. The finished inside diameter shall not be less than 8.125 inches and no more than 8.128 inches. The thickness of the tube must in no place be less than one-half inch.

The diameter of the counterbore at the bottom of the bell shall not be more than 8.879 inches nor less than 8.877 inches. The outside diameter of the male end shall not be more than 8.876 inches nor less than 8.874 inches. The counterbore shall not be eccentric with the bore more than three-thousandths of an inch.

The dimensions of the bell shall be substantially as shown by the accompanying drawing, Schedule A. In special pieces having a flange instead of a bell joint the same limitations in diameter and eccentricity of the tongue and groove shall apply as stated above for the bell joint.

A cast-iron gauge 12 inches long having a band 1 inch wide and 8.125 inches diameter on each end of it must pass freely through each piece of tube.

In order to connect with bends, terminals or for filling in a given space between two lines of tube, special length of tube will be required; dimensions and forms of these special tubes are to be furnished as required.

The contractor will provide at his own expense accurate hardened steel gauges to test the correctness of all important dimensions of the tube. The correctness of the gauges to be verified by the engineer. The following pin gauges will be required:

	Inches.		Inches.
A.....	8.125	E.....	8.877
D.....	8.879	H.....	8.774
G.....	8.876	C.....	8.878
B.....	8.128	F.....	8.875

Inspection.—Each and every tube shall be open to inspection by the engineer at any stage of its manufacture or after completion. The contractor shall furnish every facility requested for such inspection and shall place the tubes, at his own expense, in such positions for inspection as may be requested by the engineer.

Any pieces of tubing found defective in process of machining shall be rejected and the engineer shall have the sole authority to decide what constitutes defects, and there shall be no appeal from his decision. Any tubes found defective after delivery to the Batcheller Pneumatic Tube Company shall be promptly removed by the contractor, and no charge shall be made for such tubes or for the cost of cartage or shipment. The contractor shall reimburse the Batcheller Pneumatic Tube Company for all defective tubes which he has delivered and for which he has received payment.

The engineer or his representative shall have authority to reject any and all tube not fulfilling the requirements of these specifications or the contract to which they are attached.

Weight and measurement.—A memorandum of all tubes delivered shall be furnished by the contractor to the Batcheller Pneumatic Tube Company, such list to contain the number of each tube, its finished weight, and the running length measured from face of counterbore to face of plain end. Each memorandum shall be dated and signed by the contractor or his representative, which signature shall be an attestation of its correctness.

Delivery.—All tubes shall be delivered F. O. B. in Philadelphia, Pa. They shall be carefully packed in the cars so that they will not become injured in transportation. Before shipment all finished surfaces must be thoroughly coated with oil or grease by the contractor at his own expense. The oil or grease used and the manner of applying it must be approved by the engineer.

Prices.—(1) Prices named in the contract shall be for tubes per running foot, measured from the face of the counterbore to the face of the plain end.

(2) Special pieces of the tubes manufactured to exact specified length, but of the same general character and form as the regular pieces, shall be estimated double their actual length and charged for upon this basis.

(3) Special pieces of tube with flanges on one or both ends shall be estimated at double their actual length and charged for upon this basis, plus a specified amount for each flange.

[The Batcheller Pneumatic Tube Co., Philadelphia, Pa.]

SPECIFICATIONS FOR BENT BRASS TUBES AND FITTINGS.

Description.—The tubes must be made of brass, drawn from a plate and seamless.

Dimensions.—The inside diameter of the tube shall be $8\frac{3}{8}$ inches and the wall shall be one-eighth of an inch thick. The length of each piece is to be specified when ordered.

The inside diameter must not vary either way from $8\frac{3}{8}$ inches by more than one-thirty-second of an inch in any part of any tube before or after bending. The thickness must not be less than 0.123 inch or more than 0.127 inch.

The minimum radius of curvature of any part of any tube measure to the axis of the tube shall not be less than 8 feet, and only greater than this when specially ordered.

Bending.—All tubes must be bent with an even smooth curvature without buckling or ridges.

Any tubes containing cracks or flaws or defects of any kind, whether in the original tube or developed in bending, will be rejected.

Cleaning of tubes.—All material used for filling the tube while bending must be removed and the interior surface of the tubes made clean.

Drawings.—Drawings of all tubes with all necessary dimensions will be furnished to the contractor by the Batcheller Pneumatic Tube Company and the tubes must be bent accurately to the dimensions given.

The contractor shall make at his own expense wooden templates to test the correctness of the curvature of each tube. Each tube must be bent in one plane unless specially ordered otherwise.

The engineer of the Batcheller Pneumatic Tube Company, or his representative, shall have the right to reject any or all tubes which in his judgment are defective, or that are not made correct to the dimensions given or that do not in any respect fulfill the terms of this specification, and there shall be no appeal from his decision.

Fittings.—The ends of the tubes shall be fitted with, or have attached to them, flanges, cast-iron bell, or cast-iron male ends for the purpose of connecting the bent brass tubes to the other tubes, or to terminal apparatus or other parts of a pneumatic tube system.

The construction of these fittings or end pieces is shown with all the dimensions in the attached drawing.

The fittings are to be attached to the tubes by accurately fitting, riveting, and soldering.

The heads of the rivets must not protrude into the interior of the tube; all solder that may get into the interior of the tube must be removed.

The solder must unite with the iron over the entire surface of the recess made to contain it and also with the brass. The surface of the two parts that are united on the end piece and on the tube must be thoroughly coated with solder, and all traces of the soldering fluid must be removed after the work of soldering has been completed.

Flanges—cast-iron bell and male ends.—The inside diameter of the flange ends is $8\frac{3}{8}$ inches, and no tubes will be accepted that are less than 8.373 inches or more than 8.377 inches.

The inside diameter of the cast-iron bell and male ends are tapering, from $8\frac{3}{8}$ inches to $8\frac{1}{4}$ inches, and none will be accepted that are less than 8.373 inches or more than 8.377 inches at the large end and less than 8.125 inches or more than 8.128 inches at the small end.

The inside diameter of the cast-iron bell and plain ends where they all join to the brass tubes is $8\frac{3}{8}$ inches; none must be more than 8.628 inches.

The diameter of the counterbore in the bell is 8.878 inches, and must not be less than 8.877 inches or more than 8.879 inches. The outside diameter of the plain end is $8\frac{7}{8}$ inches, and none will be accepted less than 8.874 inches or more than 8.876 inches.

The same variations in diameter will be allowed for the tongue and groove on the faces of the flanges.

The engineer of the Batcheller Pneumatic Tube Company, or his representative, shall have the right to reject any tubes that vary more in dimensions than the amount stated above.

Castings.—All castings must be of good quality, sound, free from blow holes, sand holes, sponginess, hard spots, brittleness, or other defects. The cast iron must have a tensile strength of 17,000 pounds per square inch, and bronze composition a tensile strength of 32,000 pounds per square inch with an elongation of 18 per cent in 5 inches and an elastic limit of ——— pounds per square inch.

Tests and inspections.—After each tube is bent and the end pieces are attached ready for delivery a gouge ball 8.34375 inches in diameter shall pass freely through the tubes and each tube shall be so tested. Any tube through which the ball will not pass shall be rejected.

The tubes shall be open for inspection by the engineer of the Batcheller Pneumatic Tube Company or his representative at any time during the process of manufacture, and the contractor shall at his own expense place the tubes in any convenient position requested for such inspection. Any tubes delivered to the Batcheller Pneumatic Tube Company and afterwards found defective shall be taken back by the contractor and no charge made for the same, or if they have already been paid for the amount of the price paid for such defective tubes shall be refunded, together with all cost of cartage or freight.

Delivery.—All tubes shall be delivered f. o. b. Philadelphia, Pa., securely boxed so that they will not be injured in shipment with ordinary handling.

Price.—The price for which the contractor agrees to furnish these bent brass tubes shall be estimated per pound, bent without end pieces or flanges attached. Sixteen inches of straight tube at the end of each curvature is required for bending, and if any part of this 16 inches or fraction thereof shall be charged for at the same rate per pound as if it remained a part of the bent tube.

The price for each cast-iron bell or male end finished and attached to the bent brass tubes shall be estimated per piece.

Weight.—The weight of each bent brass tube without end pieces or flanges shall be distinctly marked with black paint on the outside of the respective tubes.

Marks.—Distinguishing marks given on the drawings shall be distinctly painted on the outside of each tube.

[William J. Kelly, Pneumatic Dispatch Tube Works, Philadelphia, Pa.]

SPECIFICATIONS.

Cast-iron pipe for pneumatic tubes.—In order to better understand the requirements of this pipe the following explanation is made:

The pipe is used for pneumatic dispatch tubes. Light steel carriers are propelled through it by means of a current of air under pressure. In order that the carriers may travel swiftly and smoothly through the tube the interior of each length of pipe is bored smooth and accurate to dimensions. Bell joints are made calked with lead and oakum. In order that there may be no obstructions at the joints and that the alignment of the length may be perfect, a counterbore is made at the bottom of each bell and the plain ends are turned to fit the counterbores. This machine work is done by the party purchasing the pipe.

All pipe must be furnished subject to the following specifications:

Dimensions.—The pipe is to be cast in 12-foot running lengths with the bell upon one end and the other end plain.

The inside diameter is to be 8 inches.

The outside diameter is to be 9½ inches.

The dimensions of the bell are given in the accompanying drawing marked "A." The interior surface must not deviate from a true 8-inch diameter cylinder by an amount that in boring to a diameter of 8½ inches unfinished spots will be left where the boring tool did not touch the metal. All lengths failing to clean up because of irregularities in the core or excessive diameter shall be rejected.

Any length of pipe having an inside diameter less than 7⅞ inches shall be rejected. Lengths of pipe less than 12 feet in length will be accepted, provided not more than 10 per cent of all pipe furnished be less than 12 feet and more than 11 feet 8 inches, and that not more than 5 per cent be less than 11 feet 8 inches and more than 6 feet. The ends of all short lengths must be cut square, not broken irregularly.

The length shall be measured from the bottom of the counter-bore in the bell to the end of the plain end.

The lengths shall be straight, and all lengths deviating from a straight line by more than one-fourth of an inch shall be rejected. This deviation shall be the maximum distance between a straight bar placed inside the pipe and the interior surface of the pipe, as shown in the drawing attached and marked "B."

The thickness of the cylindrical part of the pipe shall be five-eighths of an inch, and in no place shall it be less than nine-sixteenths of an inch nor more than eleven-sixteenths of an inch.

The core must be correctly placed in the mold longitudinally as well as centrally, and in case the core shifts longitudinally more than an eighth of an inch, that length of pipe may be rejected. This will be determined by the thickness of the metal at the bottom of the bell.

Material.—The pipe must be made of a good quality of cast iron that is soft enough to bore readily without excessive dulling of tools. The iron must be uniform in quality, free from hard spots or other defects. There must be no chill at the plain ends of the pipe nor in any part of it that is to be machined.

A 12-foot length of 8-inch pipe of good quality can be bored by a cutter head carrying six cutters in from three to five hours, the cutter head passing once through the pipe.

If the material of the pipe is so hard that a longer time than this is required to bore it, or if it rapidly destroys the cutters, such pipe shall be rejected.

All pipe having cracks, flaws, sand holes, blow holes, or other defects, shall be rejected.

The iron must have a tensile strength of not less than 16,000 pounds per square inch. Test bars are to be made as often and in such manner as required by Mr. William J. Kelly or his representative. The contractor shall bear all the expense of testing the specimens.

Cleaning.—All castings must be thoroughly cleaned of all sand, dirt, and dust, particularly the surfaces that are to be machined.

Tests.—Each and every length of pipe shall be subjected to a hydraulic test pressure of 150 pounds per square inch at the foundry, and all lengths that show any leak or defect under this test pressure shall be rejected. Mr. William J. Kelly or his representative shall have the right and privilege of witnessing these tests and of rejecting any lengths that may in his judgment be defective.

All tests shall be made at the expense of the contractor.

Marks.—Each and every length of pipe shall bear a number cast in relief upon the outside. All rejected lengths shall be identified and distinguished by this number.

A list containing the numbers of the rejected lengths of pipe will be furnished by Mr. William J. Kelly to the party furnishing the pipe.

Weight.—Each length of pipe shall be weighed, and each 12-foot length must not weigh more than 713 pounds nor less than 653 pounds. All lengths weighing less than this minimum or more than this maximum may be rejected. Shorter lengths must weigh proportionately, with proportionate variation. The weight of each shall be distinctly marked on the exterior with white paint by the contractor.

Coating.—Each pipe shall be coated upon the exterior with a mixture of coal tar and other ingredients, said mixture to be approved by Mr. William J. Kelly or his representative. There must be no coating upon the interior surface that is to be machined.

Delivery.—All pipe shall be delivered by the party supplying it at our siding, Tioga and Memphis streets, Philadelphia, Pa., on board cars in good condition.

Inspection, rejection, etc.—Mr. William J. Kelly or his representative shall have the right and privilege to inspect and reject, either before or after delivery, any lengths of pipe which in his judgment do not fulfill the requirements of these specifications.

He shall have the right to reject any lengths found defective in boring, and the fact that machine work has been done on the pipe shall not prevent its rejection if found not to comply with the terms of these specifications, in his judgment.

The party supplying this pipe shall promptly remove and take back, at his or their own expense, all pipe rejected for not fulfilling or complying with the terms of these specifications.

Any rejected pipe shall not be paid for, and pipe that has been paid for, if afterwards found to be defective in not complying with the terms of these specifications, shall then be rejected by Mr. William J. Kelly or his representative, and the original price paid for this rejected pipe shall be refunded by the party supplying the pipe. No deduction or addition to the price shall be made for machine work done on the pipe.

OFFICE OF PNEUMATIC TRANSIT COMPANY,
Philadelphia, November 30, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
Philadelphia, Pa.

GENTLEMEN: Replying to your request of November 16 for an estimate of the proposed system of pneumatic tubes in the city of Philadelphia, we beg to submit the following. Our estimate comprises 14 double lines of 6-inch tube:

First. A line connecting the central post-office with Station A along the following route: From central post-office out Market street to Juniper street, Juniper to South Penn square, South Penn square to Market street, Market to Eighteenth street, Eighteenth to Chestnut street, east on Chestnut to Station A.

Second. A line connecting the central post-office with Station S along the following route: From the central post-office east on Market street to Sixth, north on Sixth street to Station S.

Third. A line connecting Station S with Station O along the following route: From Station S west on Fairmount avenue to Eighth street to Station O.

Fourth. A line connecting Station S with Station J along the following route: From Station S west on Fairmount avenue to Nineteenth street, south on Nineteenth street to Station J.

Fifth. A line connecting Station J with Station C along the following route: From Station J north on Nineteenth street to Columbia avenue, west on Columbia avenue to Station C.

Sixth. A line connecting the central post-office with Station P along the following route: From central post-office south on Ninth street to Washington avenue to Station P.

Seventh. A line connecting Station P with Station D along the following route: From Station P west on Washington avenue to Eighteenth street, north on Eighteenth street to Station D.

Eighth. A line connecting Station A with Station B along the following route: From Station A west on Chestnut to Eighteenth street, north on Eighteenth to Market, west on Market across Market street bridge to Thirty-eighth street, south on Thirty-eighth street to Station B.

Ninth. A line connecting Station O with Station K along the following route: From Station O north on Eighth street to Columbia avenue, east on Columbia avenue to Front street, north on Front street to Norris street, east on Norris to Station K, southeast corner Norris and Sepviva streets.

Tenth. A line connecting Station K with Station E along the following route: From Station K west on Norris street to Frankford avenue, along Frankford avenue to Station E.

Eleventh. A line connecting Station E with Station F along the following route: From Station E north on Frankford avenue to Station F.

Twelfth. A line connecting Station O to Station Q along the following route: From Station O north on Eighth street to Columbia avenue, east on Columbia avenue to Fifth, north on Fifth street to Station Q.

Thirteenth. A line connecting Station Q with Station R along the following route: From Station Q north on Fifth street to Somerset street, west on Somerset to Germantown avenue, along Germantown avenue to Station R.

Fourteenth. A line connecting Station R with Station G along the following route: From Station R along Germantown avenue to Station G.

The length of these lines is given in the following table:

	Miles.
Central post-office to Station A, 6-inch line.....	1.061
Central post-office to Station S, 6-inch line.....	1.174
Station S to Station O, 6-inch line.....	1.152
Station S to Station J, 6-inch line.....	1.203
Station J to Station C, 6-inch line.....	1.000
Central post-office to Station P, 6-inch line.....	1.076
Station P to Station D, 6-inch line.....	.991
Station A to Station B, 6-inch line.....	1.695
Station O to Station K, 6-inch line.....	1.292
Station K to Station E, 6-inch line.....	1.424
Station E to Station F, 6-inch line.....	2.121
Station O to Station Q, 6-inch line.....	1.428
Station Q to Station R, 6-inch line.....	1.553
Station R to Station G, 6-inch line.....	2.318
Total length	19.49

For the operation of all these lines we propose the erection of a central power station to be located at some convenient point along the line of a railroad, at a distance not more than half a mile from one of the postal stations; preferably as near as possible to the center of the system. In this central power station we will erect boilers and engines with directly connected dynamos which will generate electric currents of high voltage. We propose the laying of underground conduits beside the tubes, with cables drawn into the conduits, by means of which electric power can be distributed to all the postal stations. In each postal station we propose the erection of air compressors or blowers driven by electric motors which will draw their energy from the central power station. In order that the electric cables for the distribution of power shall not be too large, a high voltage will be used with transformers at each postal station to transform from a high to a low voltage a sufficient amount of electric current to operate the motors in the respective stations.

The equipment of each station will include, besides the motors and transformers, switch boards and all necessary instruments. Each blower or air compressor will have an electric motor geared to it, which makes it very compact, occupying a small amount of space. Such a system of power distribution reduces the space occupied by the tube apparatus in the postal station to a minimum. Furthermore, it avoids the use of steam engines and boilers in the post-office.

For the line equipment we propose the use of cast-iron tubes, bored smooth and accurate on the interior, and similar in all respects to the tubes now in use in New York and Philadelphia and Boston. The carriers will travel upon bearing rings composed of a material selected by us after long experience. We adopt this construction of a bored tube and sliding carriers from the following considerations: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man, and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design, which results in giving the tube an enormous carrying capacity, so that, for example, an 8-inch tube may be used for a service that would otherwise require a 10-inch tube.

Within the postal stations we propose the use of our latest improved transmitters and receivers. The transmitters will be of an improved type, much more compact and simple in operation than those now in use by the Government. The receivers will be of a new and simplified type which permits of having the end of the tube open, so that carriers are free to come out however frequently they may be dispatched. There is no mechanism to get out of order and interrupt the passage of the carriers from the tube to the receiving table. We can not lay too much emphasis upon the use of this improved type of receiver. It increases the capacity of the line two to three times, by allowing the carriers to be dispatched so much more frequently, and the carriers are brought to rest gradually, without shock, avoiding the danger of injury to fragile articles. Several of these receivers have been constructed, one of which was on exhibition at the Paris Exposition.

There is no element of a pneumatic-tube system upon which success depends to so great an extent as upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched, and emptied at each station during each day. Lightness, simplicity, and facility of opening are essential qualifications. The carrier proposed by us will be similar in design to those used in connection with the present existing lines constructed by this company in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds and will open for its full diameter at the rear end. The latter feature greatly facilitates filling and emptying as compared with a carrier opening at the side. We find that the friction of the carrier in traveling through the tube is inconsiderable. Our preference for this type of carrier would not be altered if the friction were considerable, for at its maximum the friction of the carrier is small compared with that of the column of air. The bearing rings of the carrier travel 10,000 miles without renewing, and as they fit closely to the walls of the tube, they reduce the leakage past the carrier to a minimum.

When this system is installed carriers can be dispatched at the rate of 10 per minute, therefore the capacity of each section of each line will be 3,000 per minute, or 180,000 letters per hour in each direction. The capacity for mail of other classes will of course be somewhat less. The average speed of the carrier will be about 44 feet per second, therefore the time of transit of a carrier between the central post-office and Station A will be two minutes and seven seconds.

We find it particularly difficult to make an accurate estimate for such a system to be laid in the city of Philadelphia, especially on account of the uncertainty in the amount of paving that will have to be done. When streets are opened for the purpose of laying pipes and conduits, the city frequently requires that the pavement shall be entirely relaid between the car track and the curb. This increases the expense very considerably above what it would be if the company is only required

to repave the trench. We have assumed that only the amount of paving broken for the trench will have to be repaved.

The cost of ground for a power house and the construction of such a power house is another item of uncertainty. We have assumed that the ground will cost \$10,000 and the power house \$18,000. The following tables contain an itemized statement of the cost of constructing this entire system as we have estimated it:

Cost of construction.

ENGINEERING EXPENSES (EIGHTEEN MONTHS).

1 chief engineer	\$4,500
1 first assistant engineer	2,700
1 second assistant engineer	1,800
1 third assistant engineer	1,500
4 inspectors	4,320
1 chief draftsman	1,800
8 draftsmen (one year)	5,760
2 instruments	300
Drawing-room supplies	1,000
Total	23,680

OFFICE EXPENSES (EIGHTEEN MONTHS).

Bookkeeper	\$1,170
Stenographer	936
Office boy	312
Office rent	1,950
General expenses	900
Furniture	750
Total	6,018

CENTRAL POWER STATION.

Ground	\$10,000
Building	15,000
Chimney	3,000
Engines and dynamos	69,600
Boilers	12,080
Condensers	6,825
Pumps	1,075
Coal hoist	1,000
Ash hoist	500
Foundations	3,000
Steam and water piping	6,500
Switch boards	2,500
Wiring and lighting	500
Traveling crane	2,000
Plumbing and gas fitting	250
Repair equipment	3,000
Transformers for lighting	250
Furniture	500
Telephone exchange	250
Total	137,830

Equipment of postal stations.

CENTRAL POST-OFFICE.

3 transmitters	\$2,700.00
3 receivers	1,800.00
4 compressors	8,000.00
Piping	2,400.00
4 foundations	1,000.00
Erection	675.00
Plumbing	225.00
Lockers	150.00

Equipment of postal stations—Continued.

CENTRAL POST-OFFICE—Continued.

Repair of building.....	\$300.00
3 tanks.....	255.00
1 telephone.....	25.00
4 electric motors, 20 horsepower.....	2,727.24
8 transformers.....	1,441.84
1 switch board.....	307.69
3 telephone cable heads.....	24.00
Total	22,030.77

SUMMARY.

Central post-office.....	\$22,030.77
Station S.....	22,030.77
Station J.....	16,095.50
Station C.....	10,160.23
Station O.....	22,523.79
Station K.....	16,588.52
Station E.....	17,496.22
Station F.....	11,396.61
Station Q.....	16,588.52
Station R.....	17,496.22
Station G.....	11,396.61
Station A.....	16,424.18
Station B.....	10,488.91
Station P.....	16,095.50
Station D.....	10,160.23
Total	236,972.58

Construction of lines.

LINE A, CENTRAL POST-OFFICE TO STATION A.

10,720 feet iron tubing, at \$1.12½.....	\$12,060.00
32 brass bends, at \$1.87½.....	6,000.00
107 short lengths, at 75 cents.....	80.25
16 dutchmen, at \$56.....	896.00
21 drips, at \$24.....	504.00
5,600 feet trench, at \$1.05.....	5,880.00
Entering tubes in office.....	750.00
848 square yards paving, asphalt, at \$2.87½.....	2,438.00
2,056 square yards paving, Belgian block, at 50 cents.....	1,028.00
5,600 feet power cables, at 75.9 cents.....	\$1.30.....
5,600 feet telephone cables, at 15.1 cents.....	
5,600 feet conduits, at 39 cents.....	
16 manholes, at \$50.....	800.00
Cutting and tearing up asphalt, at 15 cents square yard.....	127.20
Total	37,843.45

SUMMARY.

A.....	\$37,843.45	I.....	\$42,375.75
B.....	37,325.50	J.....	44,795.30
C.....	36,137.50	K.....	72,654.25
D.....	39,387.45	L.....	43,880.25
E.....	38,070.60	M.....	48,598.25
F.....	34,779.00	N.....	69,524.80
G.....	33,300.75		
H.....	53,725.80	Total	632,398.65
Installation of electrical equipment.....			\$4,000.00
Conduits and cables from power house to nearest station (2,640 feet), including excavating, filling, and paving trench.....			4,956.45
456 carriers, 6-inch, at \$15.....			6,840.00

Cost of construction—Final summary.

Central power house	\$137, 830. 00
Equipment of postal stations	236, 972. 58
Construction of lines	632, 398. 65
Installation of electric equipment	4, 000. 00
Laying conduits from power house to nearest station	4, 956. 45
Engineering expenses	23, 680. 00
Office expenses	6, 018. 00
456 carriers	6, 840. 00
10 per cent to the Batcheller Pneumatic Tube Company	105, 269. 57
Total	1, 157, 965. 25

COST OF OPERATION.

The cost of operation, based on twenty hours a day and three hundred and ten days in the year, has been estimated as follows:

Superintendence	\$4, 420. 00
Office expenses	2, 236. 00
Office labor	2, 212. 00
Station labor	38, 400. 00
Power-station labor	4, 454. 00
Coal	29, 587. 50
Water	735. 07
Supplies	4, 230. 00
Ashes removed	920. 00
Repair-shop labor	6, 012. 50
Auxilliary power	346. 00
Carrier repairs	2, 618. 00
Machinery supplies	750. 00
Repair supplies	4, 500. 00
Taxes (power station)	2, 225. 00
Insurance (power station)	2, 175. 00
Total	105, 821. 07

The above estimate for the central power house includes the items of coal and water, the hauling of ashes, and the salaries of 2 electricians, 2 engine men, and 2 firemen, which is a minimum complement of attendants.

All of the stations combined will require 40 operators and 24 compressor men. The administrative expenses include the salaries of the superintendent and 3 assistants, bookkeeper, stenographer, and cost of stationery, postage, and office supplies, the office rent and charge for telephone services.

The expense of the repair shop includes the salaries of 1 master mechanic, 2 electricians, 3 machinists, and 3 helpers, together with the cost of bearing rings for carriers, and machine parts to replace those broken or worn out.

The item of supplies covers oil and waste, a considerable quantity of which will be necessary.

We have estimated taxes and insurance upon the central power station, but this does not include the taxes upon tubes or machinery which may be taxed as personal property. We have included no tax upon the item of franchise.

Basing the rental to the Government upon the net operating expenses and 10 per cent of the cost of construction, the annual rental will be:

Operation	\$105, 821. 07
10 per cent of construction	115, 796. 53
Total	221, 617. 60

PART I.

The foregoing estimate contemplates a complete system of tubes connecting all the more important postal stations and requiring about 20 miles of double 6-inch tube. You request us, in your letter of November 16, to estimate the cost of a system to connect Stations S, O, C, J, P, D, and A with the central office. This we have estimated in the same manner as for the complete system with this exception: We have assumed that if only this part is built the Government will ask to have the system

extended in the near future, and with such extension in view the power house has been made large enough for the completed system. The engines, dynamos, boilers, etc., have been made of the proper size for the completed system, but only so much of this machinery as is necessary to operate this part of the system will be installed. By constructing the power station in this manner, the first cost will be a little more than is necessary for first requirement, but the ultimate cost, when the entire system is completed, will be less.

The details of this estimate have been made up as heretofore, so we will not give them here. The total cost of construction we estimate to be \$563,061.58, and the cost of operation \$58,601.77, as follows:

SUMMARY.

Superintendence	\$3, 700. 00
Office expenses	2, 236. 00
Office labor	2, 212. 00
Station labor	19, 200. 00
Power-station labor	4, 454. 00
Coal	10, 894. 95
Water	270. 82
Supplies	2, 820. 00
Ashes removed	340. 00
Repair-shop labor	4, 076. 00
Auxiliary power	346. 00
Carrier repairs	1, 302. 00
Machinery supplies	500. 00
Repair supplies	3, 000. 00
Taxes and insurance	3, 250. 00
Total	58, 601. 77

The rental, based on 10 per cent of cost of construction and net cost of operation, will amount to:

Operation	\$58, 601. 77
10 per cent of construction	56, 306. 16
Total	114, 907. 93

PART 2.

Referring to part 2 of your letter which asks for an estimate of the cost of a system to connect Stations K, E, F with Station O, we have assumed that you wish this in addition to part 1. In other words, the cost of a system to connect Stations S, O, C, J, P, D, A, K, E, and F with the central post-office.

What we have said in regard to a central power station for part 1 applies in a similar manner to part 2.

The cost of construction we estimate to be \$833,969.14 and the cost of operation \$79,599.26, as follows:

Superintendence	\$4, 420. 00
Office expenses	2, 236. 00
Office labor	2, 212. 00
Station labor	27, 600. 00
Power-station labor	4, 454. 00
Coal	18, 684. 00
Water	464. 26
Supplies	3, 525. 00
Ashes removed	582. 00
Repair-shop labor	4, 773. 00
Auxiliary power	346. 00
Carrier repairs	1, 813. 00
Machinery supplies	650. 00
Repair supplies	4, 000. 00
Taxes and insurance	3, 840. 00
Total	79, 599. 26

The rental based on the cost of operation and 10 per cent of the cost of construction will be:

Operation.....	\$79,599.26
10 per cent of construction.....	83,396.91
Total.....	162,996.17

The following is a tabulation of the foregoing estimates:

	Part 1.	Part 2.	Complete system.
Miles.....	7.657	12.50	19.49
Construction.....	\$563,061.58	\$833,969.14	\$1,157,965.25
Operation.....	58,601.77	79,599.26	105,821.07
Rental.....	114,907.93	162,996.17	221,617.60

Finally, in regard to reducing the cost of the existing lines of tubes between the central post-office and the Bourse, the central post-office and the Pennsylvania Railroad, and the central post-office and the Reading Railroad.

For this service the Government now pays this company \$40,900 a year, but this includes the wagon service, for which the Government formerly paid upwards of half this sum. This rental at present barely defrays operating expenses and meets the fixed charges of the company. Not a single officer receives any salary whatever, nor has the company ever paid a dollar to its stockholders. Its capital, \$500,000, remains the same as when organized. Its bonded indebtedness is \$200,000, twenty-year 5 percents. In this connection we will, if desired by the commission, forward a copy of our last trial balance sheet.

There are, however, two important items of expense which might be reduced if a complete system were constructed.

First, by replacing the air compressors in the Pennsylvania Railroad station with electric-driven compressors, operating from the central power station, a saving might be made. This item at present amounts to \$5,000. Of course the company would be glad to give the Department the benefit of this or any other economies in operation that might be thus effected.

Second, the operating-labor item. This is even more important, amounting to over \$10,000 a year. We are inclined to believe, as a result of our experience, that the Government could have this labor performed with but little if any extra expense to the Department; and with a thorough drill in the use of the system, such as this company would be glad to give, we fail to see why the result would not on the whole be quite satisfactory.

Respectfully submitted.

WILLIAM J. KELLY, *President.*

CINCINNATI.

POST-OFFICE, EXECUTIVE DIVISION,
Cincinnati, Ohio, September 4, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

DEAR SIR: In response to yours of August 14, with inclosure of copy of order No. 989, from the Hon. Charles Emory Smith, Postmaster-General, under date of August 13, 1900, I have arranged with the division superintendent of the Railway Mail Service and taken up the questions raised in said order, and herewith file the statistics collected by Mr. Holloway upon the time of arrival and departure of trains at Cincinnati and all stations; also the statement of the daily average number of pouches and tie sacks transferred between depots at Cincinnati, Ohio; also the report of superintendent of mails, this office, giving the mail dispatched to and received from the different railway

stations during a period of twenty-four hours. I also inclose report of distance, in miles, from the general post-office to all the railroad stations; also report distance, in miles, from the general post-office to the carrier stations.

Space will be necessary at railroad stations to handle mail matter being transferred to the pneumatic tubes, and it is estimated that ten additional clerks will be required to handle this mail, unless the distribution in pneumatic carriers is made by the Railway Mail Service before reaching the city.

I am not prepared to recommend or disapprove the use of the pneumatic tube, until, through further investigation, I may be able to speak accurately about the increased cost of the service, and whether there can be a reduction in the expense of mail wagons.

We will be ready to act in concert with any committee of postal officials representing the Department to review the situation and make an official report.

Respectfully submitted.

Yours, truly,

ELIAS R. MONFORT, *Postmaster.*

RAILWAY MAIL SERVICE,
OFFICE OF SUPERINTENDENT,
Cincinnati, August 24, 1900.

HON. E. R. MONFORT,
Postmaster, Cincinnati, Ohio.

SIR: In connection with instructions received by you under date of August 14 from the honorable Second Assistant Postmaster-General, to make investigation as to the necessity for the establishment of pneumatic-tube service in this city, and in conformity with our conversation on the subject, I have had careful record made showing the arrival and departure of all mail and express trains which carry mail and which would in any way be identified with any service that might be inaugurated now or hereafter. Also the daily average amount of mail matter in pouches and sacks which is transferred from incoming trains at each depot to outgoing trains at other depots, no record being made of any matter connected in same depots or to or from your office.

While the investigation at this time will have reference more directly to first-class mail only, I have deemed it expedient to include separately the record of other classes handled in tie sacks, so that the Department might have full information in case such data be desired now or in the immediate future.

The present admirable arrangement in effect on all lines handling trains in and out of Cincinnati are such that in practically all cases trains are scheduled to arrive at such time and sufficiently in advance of the time of departure of outgoing trains at other depots as to allow ample time to make proper connection with said outgoing trains via the present wagon service, this except when incoming trains are late, which of course does at times occur, and which condition would not be changed with tube service, except that it might lessen the number of failures in connection, a very small percentage, by transfer being made on a less margin of time.

This situation as a whole would seem to indicate that so long as present train-schedule arrangements and wagon service are maintained, there would be but little advantage derived from the establishment of a pneumatic-tube service so far as the handling of transfer mails between depots is concerned.

I also include a record showing the daily average dispatch of mails to and from Covington and Newport, Ky., it being understood that all said matter passes through Cincinnati post-office and would naturally be included in a tube service over some part of the route, if inaugurated.

The schedules for delivery of mails throughout the city by your carrier service is, I believe, arranged to suit the schedules of incoming trains, and, with one or two exceptions, the connections are regularly made, so that mails as a rule go out in the first carrier delivery after the scheduled arrival of train. This would seem to reduce the question of tube service to a consideration of two propositions: First, the amount of outgoing mails collected in your office after departure of closing dispatch as now

arranged, and which could be connected via same trains by a later closing through tube service; and, second, whether any benefit would accrue by a little earlier carrier service, which might be secured by a quicker transfer of mails from incoming trains, to your office, through tube service. These records, however, I anticipate will be included in the information now being secured by you to determine correctly the quantity of matter, time gained, and resultant benefits accruing to all mails arriving at or departing from your office and to or from the stations of your office and incoming and outgoing trains.

Any additional assistance desired by you in securing data covering other features of the honorable Second Assistant Postmaster-General's request will be gladly rendered.

Very respectfully,

O. T. HOLLOWAY, *Superintendent.*

EXHIBIT A.—*Time of arrival and departure of mail and express trains at Cincinnati, Ohio, all stations.*

GRAND CENTRAL STATION.

Railroad title.	Railway post-office title.	Mail trains.		Express trains.	
		Arrive.	Depart.	Arrive.	Depart.
C., C., C. & St. L.	Buffalo and Cincinnati.	6.50 a. m. 10.45 a. m. 4.30 p. m. 7.45 p. m.	8.30 a. m. 2.30 p. m. 6.30 p. m. 9.35 p. m.	1.05 p. m. 9.55 p. m.	12.30 p. m. 4.10 p. m.
C., C., C. & St. L.	Cambridge City and Cincinnati.	9.35 a. m.	4.30 p. m.	6.15 p. m.	7.20 a. m.
C., C., C. & St. L.	Chicago and Cincinnati.	7.10 a. m. 11.00 a. m. 6.00 p. m.	8.30 a. m. 2.30 p. m. 8.00 p. m.	7.30 a. m. 9.05 p. m.	7.20 a. m. 12.20 p. m.
C., N. O. & T. P.	Cincinnati and Chattanooga	7.45 a. m. 10.05 a. m. 7.30 p. m.	8.30 a. m. 4.00 p. m. 8.00 p. m.	5.50 p. m.	6.50 a. m.
L. & N.	Cincinnati and Nashville ...			7.03 a. m. 11.46 a. m. 4.03 p. m. 5.43 p. m. 8.28 p. m.	7.40 a. m. 11.00 a. m. 3.25 p. m. 5.45 p. m. 11.00 p. m.
L. & N.	Cincinnati and Livingston ..	6.00 p. m.	8.05 a. m.		
L. & N.	Cincinnati and Rowland	7.30 a. m.	7.55 p. m.		
B. & O. S. W.	Cincinnati and St. Louis.	7.30 a. m. 11.45 a. m. 6.00 p. m.	2.25 a. m. 8.50 a. m. 8.05 p. m.	8.30 a. m. 5.30 p. m. 7.31 p. m.	6.55 a. m. 2.00 p. m. 4.45 p. m. 6.00 p. m. 3.30 p. m.
B. & O. S. W.	Grafton and Cincinnati	2.05 a. m. 8.00 a. m. 5.48 p. m.	8.15 a. m. 12.15 p. m. 6.35 p. m.	10.30 a. m.	
C. & O.	Hinton and Cincinnati.	8.00 a. m.	7.45 a. m. 12.01 p. m.		
B. & O. S. W.	Pittsburg, Wheeling and Cincinnati.	5.00 p. m. 12.25 p. m. 5.30 p. m.	9.10 p. m. 3.25 a. m. 8.00 a. m. 2.00 p. m.	7.30 a. m. 9.40 p. m.	8.00 p. m.

PENNSYLVANIA STATION.

P., C., C. & St. L.	Chicago, Richmond and Cincinnati.	7.15 a. m. 11.40 a. m. 6.05 p. m.	8.50 a. m. 4.35 p. m. 8.35 p. m.	7.25 a. m. 6.25 p. m.	10.15 a. m. 7.00 p. m.
L. & N.	Cincinnati and Nashville! ...	7.05 a. m. 11.50 a. m. 4.05 p. m. 5.45 p. m.	7.40 a. m. 11.00 a. m. 5.45 p. m. 11.00 p. m.	8.30 p. m.	3.25 p. m.
C., G. & P.	Georgetown and Cincinnati.	8.40 a. m. 5.45 p. m. 7.20 p. m.	8.55 a. m. 4.35 p. m. 8.00 a. m.		
C., P. & V. and Ohio River, P., C., C. & St. L.	Pittsburg, Kenova and Cincinnati. Pittsburg and Cincinnati.	6.30 a. m. 12.50 p. m. 5.30 p. m.	8.30 a. m. 1.50 p. m. 8.00 p. m.	10.40 a. m.	4.30 p. m.

EXHIBIT A.—*Time of arrival and departure of mail and express trains at Cincinnati, Ohio, all stations—Continued.*

CINCINNATI, HAMILTON AND DAYTON STATION.

Railroad title.	Railway post-office title.	Mail trains.		Express trains.	
		Arrive.	Depart.	Arrive.	Depart.
C., H. & D.....	Chicago, Monon and Cincinnati.	7.40 a. m.	3.30 a. m.	2.25 p. m.	8.30 a. m.
		11.35 a. m.	12.20 p. m.	6.00 p. m.	3.30 p. m.
C., H. & D.....	Detroit and Cincinnati.....	7.45 p. m.	8.45 p. m.	10.50 p. m.	7.30 p. m.
		6.55 a. m.	8.20 a. m.	9.50 a. m.	4.00 a. m.
		12.00 a. m.	1.00 p. m.	8.10 p. m.	6.25 p. m.
		1.45 p. m.	4.40 p. m.		
		4.45 p. m.	10.00 p. m.		

CINCINNATI, LEBANON AND NORTHERN STATION.

C. N	Jackson and Cincinnati.....	7.00 p. m.	8.15 a. m.	11.55 a. m.	4.30 p. m.
C., L. & N	Lebanon and Cincinnati....	5.45 p. m.	7.50 a. m.	8.45 a. m.	6.30 p. m.
C., P. & V	Pittsburg, Kenova and Cincinnati.			1.30 p. m.	2.00 p. m.
		9.40 a. m.	5.10 p. m.	6.00 p. m.	5.00 p. m.
					8.00 a. m.

FOURTH STREET RAILROAD STATION.

L. & N	Cincinnati, Paris and Lexington.	10.30 a. m.	2.55 p. m.		
C. & O	Hinton and Cincinnati.....	11.15 a. m.			2.50 p. m.

EXHIBIT B.—*Statement of the daily average number of pouches and tie sacks transferred between depots at Cincinnati, Ohio.*

Dispatched from— Railway post-office title.	Train.	Time arrived.	Dispatched to—		Time departed.	Quantity.	
			Railway post-office title.	Train.		Pouches.	Sacks.
Buffalo and Cincinnati	37	6.50 a. m.	Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	2
			Georgetown and Cincinnati.....	2	8.55 a. m.	1	1
			Jackson and Cincinnati.....	2	8.15 a. m.	1	2
			Lebanon and Cincinnati.....	3	7.50 a. m.	1	2
			Pittsburg and Cincinnati.....	6	8.30 a. m.	1	....
			Pittsburg, Kenova and Cincinnati..	39	8.00 a. m.	1	2
	11 38	10.45 a. m. 7.45 p. m.	Chicago, Monon and Cincinnati....	30	12.20 p. m.	1	4
			Chicago, Monon and Cincinnati....	36	8.45 p. m.	1	3
			Chicago, Richmond and Cincinnati	3	8.35 p. m.	1	3
			Detroit and Cincinnati.....	12	10.00 p. m.	1	3
			Chicago, Richmond and Cincinnati	19	8.50 a. m.	1	2
			Georgetown and Cincinnati.....	2	8.55 a. m.	1	1
Chicago and Cincinnati	34	7.10 a. m.	Jackson and Cincinnati.....	2	8.15 a. m.	1	1
			Lebanon and Cincinnati.....	3	7.50 a. m.	1	1
			Pittsburg and Cincinnati.....	6	8.30 a. m.	1	2
			Pittsburg, Kenova and Cincinnati..	39	8.00 a. m.	1	5
			Chicago, Monon and Cincinnati....	36	8.45 p. m.	1	....
			Chicago, Richmond and Cincinnati	3	8.35 p. m.	1	2
	16	6.00 p. m.	Detroit and Cincinnati.....	12	10.00 p. m.	1	1
			Mackinaw and Richmond.....	5	7.00 p. m.	1	1
			Pittsburg and Cincinnati.....	2	8.00 p. m.	1	....
			Chicago, Richmond and Cincinnati	19	8.50 a. m.	1	10
			Georgetown and Cincinnati.....	2	8.55 a. m.	1	....
			Pittsburg and Cincinnati.....	6	8.30 a. m.	1	12
Cincinnati and Chattanooga.	4	7.45 a. m.	Chicago, Monon and Cincinnati....	36	8.45 p. m.	1	1
			Chicago, Richmond and Cincinnati	3	8.35 p. m.	1	1
			Detroit and Cincinnati.....	12	10.00 p. m.	1	6
	2	7.30 p. m.	Pittsburg and Cincinnati.....	2	8.00 p. m.	1	10
			Detroit and Cincinnati.....	6	8.20 a. m.	1	5
			Chicago, Monon and Cincinnati....	30	12.20 p. m.	1	....
Cincinnati and Nashville.	2	7.05 a. m.	Detroit and Cincinnati.....	4	1.00 p. m.	1	1
			Detroit and Cincinnati.....	10	4.40 p. m.	1	....
	8 4 10	11.46 a. m. 4.05 p. m. 8.28 p. m.	Detroit and Cincinnati.....	4	1.00 p. m.	1	1
			Detroit and Cincinnati.....	10	4.40 p. m.	1	....
		Detroit and Cincinnati.....	12	10.00 p. m.	1	1	

EXHIBIT B.—Statement of the daily average number of pouches and tie sacks transferred between depots at Cincinnati, Ohio—Continued.

Dispatched from—		Train.	Time ar- rived.	Dispatched to—		Time de- parted.	Quan- tity.	
Railway post-office title.	Railway post-office title.			Train.	Pouches.		Sacks.	
Cincinnati and Living- ston.	6	6.00 p. m.	Chicago, Richmond and Cincinnati.	3	8.35 p. m.	1	.....
			Detroit and Cincinnati.	12	10.00 p. m.	1	1	
Cincinnati and Row- land.	4	7.30 a. m.	Pittsburg and Cincinnati.	4	8.00 p. m.	1	2	
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	.....
Cincinnati and St. Louis.	12	7.30 a. m.	Detroit and Cincinnati.	6	8.20 a. m.	1	1	
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	2	
			Detroit and Cincinnati.	6	8.20 a. m.	1	2	
			Georgetown and Cincinnati.	2	8.55 a. m.	1	1	
			Jackson and Cincinnati.	2	8.15 a. m.	1	1	
			Pittsburg and Cincinnati.	6	8.30 a. m.	1	3	
			Pittsburg, Kenova and Cincinnati.	39	8.00 a. m.	1	4	
			Chicago, Monon and Cincinnati.	30	12.20 p. m.	1	.....
			Detroit and Cincinnati.	4	1.00 p. m.	1	1	
			Chicago, Monon and Cincinnati.	36	8.45 p. m.	1	1	
			Chicago, Richmond and Cincinnati.	3	8.35 p. m.	1	2	
			Detroit and Cincinnati.	12	10.00 p. m.	1	2	
			Mackinaw and Richmond.	5	7.00 p. m.	1	.....
			Pittsburg and Cincinnati.	2	8.60 p. m.	1	4	
Grafton and Cincin- nati.	5	2.05 a. m.	Chicago, Monon and Cincinnati.	32	3.30 a. m.	4	45	
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	15	
			Detroit and Cincinnati.	6	8.20 a. m.	1	5	
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	3	30	
			Georgetown and Cincinnati.	2	8.55 a. m.	1	1	
			Chicago, Monon and Cincinnati.	36	8.45 p. m.	1	1	
			Chicago, Richmond and Cincinnati.	3	8.35 p. m.	1	1	
			Detroit and Cincinnati.	12	10.00 p. m.	1	1	
			Mackinaw and Richmond.	5	7.00 p. m.	1	.....
			Pittsburg and Cincinnati.	2	8.00 p. m.	1	1	
Hinton and Cincin- nati.	1	8.00 a. m.	Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	8	
			Detroit and Cincinnati.	6	8.20 a. m.	1	2	
			Georgetown and Cincinnati.	2	8.55 a. m.	1	.....
			Pittsburg and Cincinnati.	6	8.30 a. m.	1	2	
			Detroit and Cincinnati.	12	10.00 p. m.	1	2	
			Pittsburg and Cincinnati.	2	8.00 p. m.	1	2	
Pittsburg, Wheeling and Cincinnati.	103	5.30 p. m.	Chicago, Monon and Cincinnati.	36	8.45 p. m.	1	.....
			Chicago, Richmond and Cincinnati.	3	8.35 p. m.	1	1	
			Detroit and Cincinnati.	12	10.00 p. m.	1	1	
			Pittsburg and Cincinnati.	2	8.00 p. m.	1	1	
Chicago, Richmond and Cincinnati.	6	7.15 a. m.	Buffalo and Cincinnati.	46	8.30 a. m.	1	1	
			Chicago and Cincinnati.	11	8.30 a. m.	1	1	
			Cincinnati and Chattanooga.	1	8.30 a. m.	1	3	
			Cincinnati and Livingston.	1	8.05 a. m.	1	1	
			Cincinnati and St. Louis.	1	8.50 a. m.	1	1	
			Grafton and Cincinnati.	12	8.15 a. m.	1	2	
			Hinton and Cincinnati.	16	7.45 a. m.	1	3	
			Jackson and Cincinnati.	2	8.15 a. m.	1	1	
			Lebanon and Cincinnati.	3	7.50 a. m.	1	1	
			Pittsburg, Wheeling and Cincin- nati.	104	8.00 a. m.	1	1	
			Buffalo and Cincinnati.	18	6.30 p. m.	1	4	
			Chicago and Cincinnati.	35	8.00 p. m.	1	4	
			Cincinnati and Chattanooga.	3	8.00 p. m.	1	6	
			Cincinnati and Rowland.	5	7.55 p. m.	1	.....
			Cincinnati and St. Louis.	3	8.05 p. m.	1	3	
			Detroit and Cincinnati.	12	10.00 p. m.	1	1	
			Grafton and Cincinnati.	2	6.35 p. m.	1	2	
			Hinton and Cincinnati.	4	9.10 p. m.	1	2	
Pittsburg, Kenova and Cincinnati.	38	7.20 p. m.	Chicago and Cincinnati.	35	8.00 p. m.	1	1	
			Cincinnati and Chattanooga.	3	8.00 p. m.	1	1	
			Cincinnati and St. Louis.	3	8.05 p. m.	1	1	
			Detroit and Cincinnati.	12	10.00 p. m.	.....	1
			Hinton and Cincinnati.	4	9.10 p. m.	1	5	
			Buffalo and Cincinnati.	46	8.30 a. m.	1	1	
Pittsburg and Cincin- nati.	5	6.30 a. m.	Chicago and Cincinnati.	11	8.30 a. m.	1	3	
			Cincinnati and Chattanooga.	1	8.30 a. m.	3	43	
			Cincinnati and Livingston.	1	8.05 a. m.	1	2	
			Cincinnati and St. Louis.	1	8.50 a. m.	1	5	
			Detroit and Cincinnati.	6	8.20 a. m.	1	1	
			Grafton and Cincinnati.	12	8.15 a. m.	1	1	
			Hinton and Cincinnati.	16	7.45 a. m.	1	5	
			Jackson and Cincinnati.	2	8.15 a. m.	1	1	
			Lebanon and Cincinnati.	3	7.50 a. m.	1	1	
			Louisville and Fulton.	101	8.15 a. m.	1	19	
			North Vernon and Louisville.	15	8.15 a. m.	1	1	
			Pittsburg, Wheeling and Cincin- nati.	104	8.00 a. m.	1	1	
	33	12.50 p. m.	Pittsburg, Wheeling and Cincin- nati.	108	-2.00 p. m.	1	.....

EXHIBIT B.—Statement of the daily average number of pouches and tie sacks transferred between depots at Cincinnati, Ohio—Continued.

Dispatched from—		Dispatched to—				Quantity.	
Railway post-office title.	Train.	Time arrived.	Railway post-office title.	Train.	Time departed.	Pouches.	Sacks.
Pittsburg and Cincinnati.	19	5.30 p. m.	Buffalo and Cincinnati.....	18	6.30 p. m.	1	1
			Chicago and Cincinnati.....	35	8.00 p. m.	1	9
			Cincinnati and Chattanooga.....	3	8.00 p. m.	1	34
			Cincinnati and Rowland.....	5	7.55 p. m.	1	12
			Cincinnati and St. Louis.....	3	8.05 p. m.	1	13
			Detroit and Cincinnati.....	12	10.00 p. m.	1	3
			Hinton and Cincinnati.....	4	9.10 p. m.	1	11
			Buffalo and Cincinnati.....	46	8.30 a. m.	1	....
			Chicago and Cincinnati.....	11	8.30 a. m.	1	....
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	1
Chicago, Monon and Cincinnati.	35	7.40 a. m.	Cincinnati and Chattanooga.....	1	8.30 a. m.	1	1
			Cincinnati and St. Louis.....	1	8.50 a. m.	1	....
			Grafton and Cincinnati.....	12	8.15 a. m.	1	2
			Buffalo and Cincinnati.....	2	2.30 p. m.	1	1
			Cincinnati and Chattanooga.....	3	8.00 p. m.	1	18
			Grafton and Cincinnati.....	4	12.15 p. m.	1	26
			Hinton and Cincinnati.....	2	12.01 p. m.	3	34
			Chicago and Cincinnati.....	37	8.00 p. m.	1	....
			Cincinnati and Nashville.....	3	11.00 p. m.	1	3
			Cincinnati and St. Louis.....	3	8.05 p. m.	1	1
Detroit and Cincinnati	7	6.55 a. m.	Hinton and Cincinnati.....	4	9.10 p. m.	1	1
			Buffalo and Cincinnati.....	46	8.30 a. m.	1	1
			Chicago and Cincinnati.....	11	8.30 a. m.	1	1
			Chicago, Richmond and Cincinnati.	19	8.50 a. m.	1	2
			Cincinnati and Chattanooga.....	1	8.30 a. m.	1	31
			Cincinnati and Livingston.....	1	8.05 a. m.	1	1
			Cincinnati and Louisville.....	5	7.40 a. m.	1	1
			Cincinnati and Nashville.....	7	11.00 a. m.	1	15
			Cincinnati and St. Louis.....	1	8.50 a. m.	1	1
			Grafton and Cincinnati.....	12	8.15 a. m.	1	2
1	1.45 p. m.	Georgetown and Cincinnati.....	2	8.55 a. m.	1	....
		Hinton and Cincinnati.....	16	7.45 a. m.	1	4	
		Jackson and Cincinnati.....	2	8.15 a. m.	1	2	
		Lebanon and Cincinnati.....	3	7.50 a. m.	1	....
		Louisville, Ky.....	....	7.40 a. m.	1	1	
		Louisville and Fulton.....	101	8.15 a. m.	1	7	
		North Vernon and Louisville.....	15	8.15 a. m.	1	1	
		Pittsburg and Cincinnati.....	6	8.30 a. m.	1	1	
		Pittsburg, Wheeling and Cincinnati	104	8.00 a. m.	1	6	
		Pittsburg, Kenova and Cincinnati..	39	8.00 a. m.	1	3	
5	4.45 p. m.	Buffalo and Cincinnati.....	16	2.30 p. m.	1	1	
		Chicago and Cincinnati.....	5	2.30 p. m.	1	1	
		Buffalo and Cincinnati.....	18	6.30 p. m.	1	1	
		Chicago and Cincinnati.....	35	8.00 p. m.	1	2	
		Cincinnati and Chattanooga.....	3	8.00 p. m.	1	7	
		Cincinnati and Rowland.....	5	7.55 p. m.	1	2	
		Cincinnati and Nashville.....	1	5.45 p. m.	1	8	
		Cincinnati and St. Louis.....	3	8.05 p. m.	1	2	
		Grafton and Cincinnati.....	2	6.35 p. m.	1	4	
		Hinton and Cincinnati.....	4	9.10 p. m.	1	5	
Jackson and Cincinnati	1	7.00 p. m.	Louisville and Fulton.....	103	6.00 p. m.	1	2
			Pittsburg and Cincinnati.....	2	8.00 p. m.	1	1
			Chicago and Cincinnati.....	35	8.00 p. m.	1	....
			Chicago, Richmond and Cincinnati	3	8.35 p. m.	1	....
			Cincinnati and Chattanooga.....	3	8.00 p. m.	1	1
			Cincinnati and St. Louis.....	3	8.05 p. m.	1	1
			Detroit and Cincinnati.....	12	10.00 p. m.	1	1
			Pittsburg and Cincinnati.....	2	8.00 p. m.	1	1
			Chicago and Cincinnati.....	35	8.00 p. m.	1	....
			Cincinnati and St. Louis.....	3	8.05 p. m.	1	....
Lebanon and Cincinnati.	18	5.45 p. m.	Pittsburg and Cincinnati.....	2	8.00 p. m.	1	....

Report showing the daily average number of pouches and tie sacks received at and dispatched from the Covington and Newport, Ky., post-offices via Cincinnati, Ohio.

	Received.		Dispatched.	
	Pouches.	Sacks.	Pouches.	Sacks.
Covington, Ky.....	10	21	13	26
Newport, Ky.....	6	23	5	9

CINCINNATI, OHIO, POST-OFFICE,
DIVISION OF DISTRIBUTION AND DISPATCH OF MAILS,

August 27, 1900.

E. R. MONFORT, Esq., *Postmaster, City.*

DEAR SIR: Attached herewith please find a statement showing the amount of mail dispatched to and received from the different railway stations for twenty-four hours.

The number of packages of letter mail and the weight of the same are given, as is also the number of sacks of paper mail and the weight, these items being the basis from which the Department obtains the number of pieces of mail matter handled.

The Superintendent of Railway Mail Service reduces the value of pneumatic-tube service to two propositions, and I believe he is right in his conclusions. The first: What amount of mail would accumulate in the office from the time the mails now close until the time they would close if dispatched by tube service? This is information which I am not now prepared to give, as I am wholly inexperienced as to the tube service; but I conclude that the difference in time would not be very much; therefore, the accumulation of mail would not be very great.

The advantage of the tube service over the wagon service is, I believe, where the mail is to be transferred great distances, and, as you are aware, the distances to three of our railroad stations from the post-office are short, being about three-quarters of a mile, while the distance to the other station is but a fraction over a mile.

The time of closing our mails has been timed to the last possible moment, but twenty minutes being allowed for the transfer to three stations and thirty minutes to the last one.

I am unfamiliar with the workings of the pneumatic-tube system, but judge that in our case the last closing could possibly be made from five to ten minutes later than at present. That length of time will permit the dispatch of a large quantity of mail, particularly to those trains which close during the busy hours of the evening.

The statement submitted represents an actual count kept for twenty-four hours; but as the mails are very light just at this time, it does not represent the amount of mail we would have during the busy season.

Very respectfully,

S. G. SULLIVAN,
Superintendent of Mails.

Report of mail dispatched to and received from the different railway stations during a period of twenty-four hours.

Railroad stations.	Letter packages.				Sacks.			
	Dispatched.		Received.		Dispatched.		Received.	
	Num-ber.	Weight.	Num-ber.	Weight.	Num-ber.	Weight.	Num-ber.	Weight.
C., L. & N.....	156	72	232	117*	41	922	25	398
P., C., C. & St. L.....	1,821	1,200	1,394	935	247	7,191	185	5,354
Grand Central.....	4,581	3,313	3,097	1,663	872	8,668	368	7,205
C., H. & D.....	1,058	623	908	469	175	3,082	120	1,767
Total.....	7,616	5,208	5,631	3,184	1,335	19,863	698	14,719

Report of the distances in miles from the general post-office to railroad stations.

General post-office to—	Miles.
The Cincinnati, Hamilton and Dayton Railway station.....	1.12
Grand Central Station.....	.86
Pittsburgh, Cincinnati, Chicago and St. Louis Railway.....	.74
Cincinnati, Lebanon and Northern Railway.....	.53

Respectfully submitted.

ELIAS R. MONFORT, *Postmaster.*

Report of the distances in miles from the general post-office to stations.

General post-office to Station—	Miles.	General post-office to Station—Ct'd.	Miles.
A	4.87	H	5.03
B	2.09	I	3.60
C	5.11	K	8.12
D	2.32	L	8.34
E	1.93	M	9.21
F	2.73	N	1.48
G	5.30	O	5.34

Respectfully submitted.

ELIAS R. MONFORT, *Postmaster.*

POST-OFFICE, EXECUTIVE DIVISION,
Cincinnati, Ohio, October 13, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The general committee on pneumatic-tube service, composed of Mr. J. M. Masten, Mr. E. W. Alexander, and Mr. J. A. Montgomery, met with Postmaster Monfort and Mr. O. T. Holloway, superintendent Railway Mail Service, the local committee, and, after a careful and protracted examination of maps, amount of mail received and dispatched, distances to the railway depots and stations, and probable cost of construction, took a car and went over the ground, visiting every depot, station, and street, spending four hours in this investigation. They also heard statements from the agents of the Batcheller Pneumatic Tube Company and the American Pneumatic Service Company. Mr. Stanley, the city engineer for the last twenty-five years, kindly accompanied the committee, and gave them detailed information as to the location of obstructions in the streets, character of the soil, and the best line to be taken in the streets. They then returned to the post-office and held a meeting for conference. The committee was much impressed with the information of Mr. Stanley in relation to the street excavations and his opinion that this pneumatic-tube work could probably be done at a cost no greater than \$1 per running foot. It therefore believes that the probable expense for such work would be much below that named in any other city, and is favorable for that reason.

The committee, acting upon instructions contained in the Postmaster-General's Order No. 989, have considered the following routes as desirable, and, in order that the necessary specifications and estimate of cost may be secured from the operating companies, have requested Postmaster Monfort to communicate them to the representatives of the two pneumatic companies, who are present. They are as follows:

First. From the general post-office west on Fifth street to John, south to the Central Union depot, distance 0.77 mile; thence by John street to Fifth street, west to the Cincinnati, Hamilton, and Dayton depot, Fifth and Baymiller, distance 0.79 mile.

Second. From the general post-office east on Fifth street to Pike, south to Third, east to Butler, south to Pennsylvania depot, distance 0.73 mile.

The two lines named to be of not less than 8 inches in diameter, and the total mileage of that size 2.29 miles.

Third. From the Cincinnati, Hamilton, and Dayton depot north on Baymiller to Eighth street, west to Freeman avenue, Station N, dis-

tance 0.50 mile; thence north on Freeman to Central avenue, north-westerly to Patterson street, Station B, distance 1.43 miles.

Fourth. From the general post-office north on Main street to Sixth street, east to Broadway, north to Court, east to the Cincinnati, Lebanon and Northern Railroad depot, distance, 0.67 miles; thence east on Court to Gilbert avenue, northeast to McMillan, and east to Station D, distance, 1.75 miles.

The two last-named lines to be of 6 inches diameter, and the total mileage of 6-inch tube 4.35 miles.

These lines constitute a total mileage provided for this city of 6.64 miles, upon which final decision will be determined by the question of cost.

It is intended by Postmaster Monfort, in the event pneumatic-tube service as outlined is provided for his office, to make each of these lines mentioned the supply both for delivery and collection of mails for the territory adjacent to the terminals. It is estimated that the population which will be supplied from Station D will amount to about 150,000 and for Station B about 50,000.

Such changes will also be made in the street postal-car service, which now runs to and from the general post-office 8 times a day, supplying Stations B, D, E, A, F, and N, so as to join closely with the pneumatic-tube service at Stations D, B, and N, omitting the mileage to and from the general post-office, using such mileage for the further improvement of the territory properly tributary to B and D under the pneumatic-tube-service arrangement.

It is expected that the joint committee will have a further session about the 1st of November, and finally pass upon the question, when the estimates and plans will be before them in definite shape.

Very respectfully,

J. M. MASTEN, *Chairman.*

J. A. MONTGOMERY,

E. W. ALEXANDER,

General Committee.

ELIAS P. MONFORT, *Postmaster.*

O. T. HOLLOWAY,

Local Committee.

THE BATCHELLER PNEUMATIC TUBE COMPANY,
Witherspoon Building, Philadelphia, November 17, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
Cincinnati, Ohio.

GENTLEMEN: Replying to your request for an estimate upon the costs of construction and operation of the proposed postal system of pneumatic tubes for the city of Cincinnati, we beg to submit the following:

We understand the system contemplated to comprise—

First, a double line of 8-inch tubes between the central post-office and the Grand Central depot, and from the latter to the Cincinnati, Hamilton and Dayton depot.

Second, a double line of 8-inch tubes from the central post-office to the Pennsylvania Railroad depot.

Third, a double line of 6-inch tubes from the Cincinnati, Hamilton and Dayton depot to Station N and thence to Station B.

Fourth, a double line of 6-inch tubes from the general post-office to the Cincinnati, Louisville and Nashville depot and thence to Station D.

After inspection of the ground we recommend the following routes for these lines, said routes being subject to such changes as condition of streets may entail, or as may be required by the commissioners of public works or other city authorities, under whose jurisdiction the subject matter comes:

The first line should traverse the alley parallel to Fifth street until it reaches Central avenue. It should then follow, in order, Central avenue and Third street to the Grand Central depot. Leaving the Grand Central depot the line should proceed up John street to the street or alley known as Webb street; it should then traverse Webb street and Baymiller street to the Cincinnati, Hamilton and Dayton depot.

The second line should follow Main street, Fifth street, Pike street, and Friendship street to the Pennsylvania depot.

The third line should follow Baymiller street, Kenyon street, and an alley to Station N; thence it should follow Freeman avenue and Harrison avenue to Station B.

The fourth line should follow Main street, Sixth street, Broadway, and Eighth street to the railroad track, following the latter to the Cincinnati, Louisville and Nashville depot. From this depot it should pass through the freight yards to the exit upon Gilbert avenue, following this avenue and McMillan street to Station B.

The lengths of these lines we believe to be, respectively, as follows:

Line No.		Miles.
1	General post-office to Grand Central depot to Cincinnati, Hamilton and Dayton depot.	1.540
2	General post-office to Pennsylvania Railroad depot.....	.810
	Total length of 8-inch lines.....	2.350
3	Cincinnati, Hamilton and Dayton depot to Station N to Station B.....	1.875
4	General post-office to Cincinnati, Louisville and Nashville depot to Station D.....	2.390
	Total length of 6-inch lines.....	4.265
	Total length of all lines.....	6.615

The system which is contemplated in the appended estimates is of the following description:

The tubes will be of cast iron, bored and polished on the interior, the carriers traveling upon bearing rings composed of a material selected by us after long experience. We adopt this construction after much thought and from the following considerations: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man, and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design which results in giving to the tube enormous carrying capacity so that, for example, an 8-foot tube may be used for a service that would otherwise require a 10-foot tube.

With the exception of the receiver, there is no element of the pneumatic-tube system upon which success depends to a greater extent than upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched and emptied at each station during each day. Lightness, simplicity, and facility of opening are essential qualifications. The carrier proposed by us will be similar in design to those used in connection with the present existing lines constructed by this company in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds (8-inch tube), and will open for its full diameter at the rear end. The latter feature greatly facilitates filling and emptying, as compared with a carrier opening at the side. We find that the friction of our carrier in traveling through the tube is inconsiderable, probably due to its traveling, not upon the walls of the tube, but upon a film of air. Our preference for this type of carrier would not be altered if the friction were considerable, for, at its maximum, the friction of the carrier is small when compared with that of the air column, as it represents but 5 per cent of the power required to operate the line. The bearing rings of this carrier travel 10,000 miles without renewing, and, as they fit closely to the walls of the tube, they reduce the leakage past the carrier to a minimum.

The receiver will be of our latest improved type, an example of which was on exhibition at the Paris Exposition. This machine is absolutely free from moving mechanism; consequently it is not necessary to maintain an interval between the carriers, and the obstruction of the tube through the derangement of mechanism is impossible. It is due to this fact that the carrying capacity of the line is enormously increased. The distance within which the carriers are retarded and finally brought to rest is so great that all shock is avoided and the danger of injury to fragile articles minimized. The form of the receiver is such that it occupies the space in out-of-the-way corners where such space is of no value for other purposes. We consider this machine the most perfect ever designed.

We propose to use a transmitter of an improved type suggested to us by our long experience.

The capacity of one of these 8-inch lines will be 10 carriers per minute, or 600 per hour. The carrier will contain 600 ordinary letters, which gives to the line a carrying capacity of 360,000 letters per hour. The capacity for mail of other classes will, of course, be somewhat less.

The velocity of the carriers in transit will be upward of 44 feet per second.

The power for operating this system will be supplied from a single power station to be located, as nearly as possible, at the geographical center of the system and on the line of one of the railways. In this power station will be erected engines of the highest type of development, directly connected with high pressure, polyphase electric generators, capable of developing 600 horsepower, which gives an ample reserve. The power will be conveyed through electric cables, which will be laid in the trenches with the tube lines, to each of the several postal stations, where the current will be transformed to a lower pressure suitable for use by the electric motors.

It may be unnecessary to call attention to the fact that the Batcheller system of pneumatic tubes is the only system that has ever been employed for the transportation of mail by the United States or any other government, and that it has stood the practical test of over seven years of actual service.

It is impossible to calculate the cost of construction of this system with absolute exactness, owing to several indeterminate elements. We have, however, prepared an estimate with the greatest possible care, and place the cost at \$636,462. This includes all items of construction and equipment, excepting as specified below. It has been assumed that ground for the erection of the central power station can be purchased for \$4,000 and the building erected for \$12,000. No provision has been made for the erection of a building to contain the terminals at the Grand Central depot or elsewhere, as it is assumed these accommodations will be provided by the Post-Office Department.

The cost of operation of the system has been estimated with great care, and we give the following condensed summary:

Superintendence	\$3,420.00
Office expenses	2,236.00
Office labor	1,612.00
Stations, labor	21,600.00
Power station:	
Labor	3,060.00
Coal	5,029.00
Water (for steam)	456.00
Removal of ashes	160.00
Repair shop:	
Labor	2,836.50
Auxiliary power	173.00
Carrier repairs	1,827.50
Machinery supplies	375.00
Repair supplies	2,250.00
Supplies (oil and waste)	2,050.00
Total	47,085.00

The above estimate for the central power station provides for salaries of two engineers and two firemen which is the minimum complement of attendants.

The item of office labor provides for bookkeeper, stenographer, and office boy.

A proper supervision of the system will require a superintendent and two assistants.

The office expenses comprise the office rent, the charge for telephone service, and the items of stationery and postage.

The repair shop must be provided with a complement consisting of master mechanic, an electrician, a machinist and a machinist's helper.

A considerable quantity of oil and waste will be required at the central power house, the repair shop, and at each of the postal stations. Much waste is used for wiping the carriers, which must be kept scrupulously clean.

Operators to the number of twenty-four will be required at the postal stations to receive and dispatch carriers and compressor men to the number of twelve to attend the compressors.

The item of taxes, insurance, and franchise are omitted from the above estimate, as they are indeterminate at this date. There is no means of knowing about the tax until the franchise is granted.

The rental of the system, if operated by us, would cover the operating expenses and 10 per cent on the cost of construction. This we consider to be a fair and equitable return for the investment. Upon this basis the annual rental would be \$110,731 plus insurance and taxes.

Attention is here directed to the fact that many items going to make up the costs of construction and operation of a pneumatic-tube system (i. e., the central power house, the expenses of supervision, etc.) do not increase in proportion to the length of the system. Hence further extensions to the system above described will cost proportionately less, both for construction and operation, than the lines composing said system.

Very truly,

THE BATCHELLER PNEUMATIC TUBE COMPANY.
JNO. E. MILHOLLAND, *President.*

AMERICAN PNEUMATIC SERVICE COMPANY,
89 State Street, Boston, October 30, 1900.

J. M. MASREN, *Chairman of Commission*, and
ELIAS R. MONFORT, *Postmaster of Cincinnati, Ohio.*

GENTLEMEN: Replying to your favor of the 15th instant, this company begs to submit:

First. That it will construct, complete, and operate a pneumatic-tube system in compliance with the first route named in your letter for the sum of \$42,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system as is required for said route for the sum of \$16,000 per year, the Government to pay the operating expenses and taxes thereon.

Second. This company will construct, complete, and operate such a system as is required for the second route named in your letter for the sum of \$22,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system as is required for said route for the sum of \$8,000 per year, the Government to pay the operating expenses and taxes thereon.

Third. We will construct, complete, and operate such a system as is required for the third route named in your letter for the sum of \$34,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system for the sum of \$15,000 per year, the Government to pay the operating expenses and taxes thereon.

Fourth. We will construct, complete, and operate the system required for the fourth route named in your letter for the sum of \$41,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system for the sum of \$20,000 per year, the Government to pay the operating expenses and taxes for the same.

We beg further to submit, in consideration of the possibilities of an enlarged and future demand upon the pneumatic tube for the transportation of mail in large cities, that a system 10 inches in diameter, such as you have seen at our works at Lowell, Mass., and such as we are now constructing for the Boston Company for the carrying of parcels, can be constructed and operated at a saving over the cost of constructing and operating the lines that you have described in your letter as 8-inch and 6-inch lines; and we therefore beg to call your attention to the following proposals, viz:

First. We will construct, complete, and operate a pneumatic-tube system, 10 inches in diameter, for the first route designated in your letter, for the sum of \$39,000 per year, the Government to provide the steam power necessary to operate the same; or we will construct, complete, and operate a 10-inch system for said route for the sum of \$14,500 per year, the Government to pay all the operating expenses therefor and taxes.

Second. We will construct, complete, and operate a 10-inch pneumatic-tube system between the points designated as the second route in your letter for the sum of \$20,700 per year, the Government to provide the steam power necessary to operate the same; or we will construct, complete, and operate a 10-inch system for said route for the sum of \$7,000 per year, the Government to pay the operating expenses and taxes.

Third. We will construct, complete, and operate a pneumatic-tube system 10 inches in diameter, covering the route designated as third in your letter, for the sum of \$36,000 per year, the Government to provide the necessary steam power for operating

the same; or we will construct, complete, and operate a system 10 inches in diameter, covering the said route, for the sum of \$16,000 per year, the Government to pay the operating expenses and taxes.

Fourth. We will construct, complete, and operate a pneumatic-tube system 10 inches in diameter, covering the fourth route named in your letter, for the sum of \$43,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate a 10-inch pneumatic-tube system, covering said route, for the sum of \$21,500 per year, the Government paying the operating expenses and taxes thereon.

Further, this company will guarantee that the operating expenses in case of the use of a 10-inch system shall be less than the corresponding amounts for an 8-inch system, and shall not exceed the amount of the same in a 6-inch system.

We further beg to call your attention to the fact that by reason of the manner in which proposals are asked for we are compelled in estimating the operating expenses to figure upon the maintenance of each system by itself as a whole, which results in the duplication of a number of expenses large in amount for each system, such as inspector, repair man, and superintendent, which, if more than one system were to be constructed and operated in any one city, would be considerably reduced, thus reducing the amount of estimates of operating expenses which we herewith submit. It is also proper to say that these estimates are made without the opportunity to make tests of the conditions of the streets, which might in many respects substantially reduce the cost which is computed for street excavation.

It is intended in this proposition that the respective systems shall be used as often and as long during the day and night as may be required for carrying all mail which can be put into the carrier.

All of which is respectfully submitted.

AMERICAN PNEUMATIC SERVICE COMPANY,
By W. E. L. DILLAWAY, *President*.

CINCINNATI, OHIO, *November 21, 1900.*

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

DEAR SIR: The joint committee on pneumatic-tube service for this city have had a further meeting in connection with the consideration of the subject, and to receive the proposals submitted by the companies competing for that work.

Estimates have been received by the committee from the American Pneumatic Service Company, of Boston, and from the Batcheller Pneumatic Tube Company, of Philadelphia. These proposals have been carefully considered by the committee, by item, and are herewith forwarded to your office for such examination and verification as the Department may decide upon. In forwarding these proposals the committee do not indorse them as being reasonable; in fact, must express the opinion that they are unreasonable. On account of the consideration of the items not being given in detail it has been impracticable for this committee to determine whether the cost has been properly stated by either company. It is evident that before a positive opinion can be expressed regarding the estimates the items must be clearly shown, and we suggest that the Department request each of the companies to state the cost of construction by items.

These estimates are so much greater than the committee, upon its first consideration of the subject, was led to expect, that it must express its disappointment with the estimates presented. The cost of obtaining the service seems excessive, and we feel that a further and closer examination of the matter by the two companies will enable them to submit proposals that are more reasonable. The committee believe that the Cincinnati post-office would be greatly benefited by the

introduction of the pneumatic-tube service, and they would gladly recommend it, but the excessive estimates made by the two companies are such that they feel that it is best to refer the matter of detail to the Department.

Referring to the estimates submitted by the American Pneumatic Service Company, we observe that it separates the routes proposed into four separate lines and names a price for the construction and operation of each one separately. The total for the four routes amounts to \$138,700 for the 10-inch tube, the Government to furnish the steam for operating. Their bid for the 8-inch tube between the general post-office and the depots and the 6-inch tube for the branch post-office service is placed at \$139,000, the Government to furnish the steam for operating. Also, this proposition includes items at which the Department may lease the tubes after construction and operate them at its own expense. The amount for such lease is fixed at \$59,000 per annum. The engineer of this company, Mr. Fordyce, was present to-day, and in answer to a question as to the cost of steam power, or the probable cost of electric power to operate the mileage provided for, said that he was unable to give definite figures, but would telegraph or write his company in Boston for information, and when received it will be forwarded to your office in connection with this report.

The estimates submitted by the Batcheller Pneumatic Tube Company placed the cost of construction for 2.35 miles of 8-inch tube, connecting the general post-office and the railroad depots, and 4.265 miles of 6-inch tube to connect the branch post-offices, at \$636,462, and propose that the pneumatic tubes, as constructed, shall be given to the Department for the transportation of mails for an annual charge of 10 per cent of this amount, \$63,646.20, and fix the cost of the operation of the system at \$47,085, and expenses, which are as yet undetermined, for insurance and taxes, making a total annual rental of \$110,731 plus insurance and taxes.

In examining these two estimates the committee expresses its preference for the proposition submitted by the Batcheller Pneumatic Tube Company, as the annual rental is less than the proposition of the American Pneumatic Service Company by some \$50,000.

In reviewing the items of operation in the proposition submitted by the Batcheller Pneumatic Tube Company, this committee believes that sufficient reduction can be made in the labor for the operation at stations and in its expenses to practically overcome the undetermined items of insurance and taxes, so that it may be considered that the cost of operation for the 6.61 miles will probably be not less than \$47,000 per year.

The committee has familiarized itself with the operation of the Batcheller system of pneumatic tubes as now in operation in New York, Brooklyn, Boston, and Philadelphia, and understands that the operation has been very successful and the stoppages infrequent. The experimental station operated by the American Pneumatic Service Company at Lowell, Mass., has also been inspected, but as it is not in practical operation in the carrying of mails many points which would be material in such a service are undetermined, and it is believed that the use of this system for mail-carrying purposes should not be undertaken until after an experimental line has been constructed and operated by the company a sufficient length of time to demonstrate its

feasibility and practicability without expense or responsibility to the Government.

The advantages of the pneumatic-tube service in Cincinnati in the transmission of mails is the gain in dispatch secured by the greater speed over wagon and street-car service. It is estimated that the gain in time thus secured between the general post-office and the Grand Central station and the Pittsburg, Cincinnati and St. Louis station, each about three-fourths of a mile distant, will be twenty minutes; the gain between the general post-office and the Cincinnati, Hamilton and Dayton depot, about twenty-five minutes; between the general post-office and Station D, fifteen minutes; Station N, ten minutes, and Station B, about twenty minutes. In addition to these gains, mail for the branch post-office districts arriving at the post-office, which are ready for dispatch between the present trips, will average about one and one-half hours, and will, in many cases, be advanced at least one hour.

The number of special-delivery letters delivered in the city is now something greater than 100,000 per annum. This class of mail will secure the greatest advantage from the pneumatic-tube service, and an increase in the volume of this mail may be expected.

In comparing the proposition for pneumatic-tube service, involving an expenditure of something over \$100,000 per annum, reference is pertinent to the cost of transportation service in the city. The regulation wagon service between the post-office and railroad stations is costing \$14,400 and the street-railway service for the carrying of the mails to the branch post-offices is costing \$6,334, a total of \$20,734. The saving in this wagon and street-car service can not be estimated at this time with any exactness, but the rearrangement of the wagon service, omitting the trips carrying the smaller mails, will permit of some saving, and the rearrangement of the street-car service, so as to supply the branch post-offices from the tube terminals, will also result in a saving, which may well be employed in providing improved service to the branch post-offices which are not provided with the pneumatic-tube service. The service to these branch offices is difficult of rearrangement, it being, in the main, now carried as closed-pouch service on the ordinary passenger cars, and does not permit of the interchange of mails between stations, as can be effected by the street-car postal service.

In connection with the proposition for installing the pneumatic-tube service, it should be borne in mind that the space in railroad depots now within the control of the Railway Mail Service, and used as transfer clerks' quarters, is not sufficient for the tube terminals, and an additional space will have to be provided for. Preliminary inquiries made in regard to this subject by Superintendent Holloway have secured offers from the railroad companies to furnish said space in the Grand Central Depot at \$30 per month; at the Pittsburg, Cincinnati, Chicago and St. Louis depot, \$600 per year, and at the Cincinnati, Hamilton and Dayton depot at about the same amount. It is understood that these figures include all necessary light, heat, and janitor service, and may be eventually reduced to correspond to the amount named for the space at the Grand Central Depot.

The necessary space for installing the machinery at the general post-office and at Stations D, N, and B is available, although the building

now occupied by the latter station may not be exactly suitable, but proper quarters in the near vicinity can readily be secured.

The inclosed tables of statistics with reference to the business of the Cincinnati post-office are submitted in connection with the estimates for the tube service.

In conclusion, the committee desires to call particular attention to the table showing gross receipts, expenses, and net revenue of the Cincinnati post-office, which indicates, for the year ending June 30, 1900, a gross business of \$1,239,986 and a net revenue to the Department of \$765,630, being at the rate of 38 per cent of cost to net revenue, which is a very gratifying showing.

It is believed that the expense of performing the transportation service in this city is upon a very low basis, and probably the best, by comparison, of that of any other large city, and these facts would seem to justify the Department in undertaking something more than the usual percentage of expense for the improvement of its local service and its connection with outgoing and incoming mail trains.

Very respectfully,

J. M. MASTEN,
Chairman.

E. W. ALEXANDER,
General Committee.

ELIAS R. MONFORT,
Postmaster.

O. T. HOLLOWAY,
Local Committee.

Gross receipts, expenses, and net revenue of the Cincinnati post-office for the fiscal years ended June 30, 1899, and June 30, 1900.

[Class 1.]

	1899.	1900.
Gross receipts	\$1,155,646.65	\$1,239,986.52
Gross expenses:		
Salary	6,000.00	6,000.00
Clerk hire	210,034.86	227,123.59
Rent, light, and fuel	4,377.70	5,002.74
Other incidental expenses	13,840.24	7,147.59
Free delivery	219,100.18	229,082.27
Total expenses	453,352.98	474,356.19
Net revenue	702,293.67	765,630.33
Per cent expense to gross receipts	39	38

Comparative statement of work performed in Cincinnati post-office during fiscal years ending June 30, 1899 and 1900.

MAILING DIVISION.

	1899.	1900.
Letters, postals, etc., dispatched.....pieces..	80, 202, 920	87, 252, 280
Newspaper mail for distribution.....do...	33, 994, 800	29, 797, 650
Total number distributed.....do...	114, 197, 720	117, 049, 930
Second-class matter mailed by publishers.....pounds..	9, 105, 883	8, 770, 668
Misdirected matter handled.....pieces..	755, 354	806, 568

CITY DELIVERY DIVISION.

Letters and other mail matter distributed.....pieces..	82, 584, 003	83, 778, 735
Total number received and handled.....do...	531, 324	478, 647
Total number received and handled by general delivery.....do...	459, 370	575, 404
Special-delivery letters received.....do...	85, 404	92, 930

REGISTRY DIVISION.

Letters and parcels (outgoing).....pieces..	64, 416	73, 288
Letters and parcels received for delivery.....do...	178, 300	207, 302
Packages received, made up, and dispatched.....do...	612, 068	700, 309
Through pouches made up and dispatched.....do...	68, 108	70, 984
Official letters and parcels (free).....do...	31, 352	31, 052
Total number of articles handled.....do...	954, 244	1, 082, 935

MONEY-ORDER DIVISION.

	1899.		1900.	
	Number.	Amount.	Number.	Amount.
Money orders issued.....	55, 731	\$537, 116. 98	59, 450	\$584, 188. 54
Money orders paid.....	492, 100	2, 867, 060. 41	550, 881	3, 234, 232. 71

Report showing number of letters and letter packages dispatched to and from Cincinnati post-office and railroad depots on Tuesday, October 9, 1900.

Depot.	To.	From.	Total.	Weight.
Grand Central:				<i>Pounds.</i>
Number of packages.....	5, 445	3, 722	9, 167	} 5, 941
Number of letters.....	217, 800	148, 880	366, 680	
Pennsylvania:				} 2, 427
Number of packages.....	2, 005	1, 651	3, 656	
Number of letters.....	80, 200	66, 040	146, 240	
Cincinnati, Hamilton and Dayton:				} 1, 494
Number of packages.....	1, 489	1, 201	2, 690	
Number of letters.....	58, 760	48, 040	107, 600	
Cincinnati, Lebanon and Northern:				} 261
Number of packages.....	248	289	537	
Number of letters.....	9, 920	11, 560	21, 480	

Weight based on former record made by actual weighing in Cincinnati post-office.

Weight and number of pieces of mail received and dispatched at stations during the twenty-four hours commencing 6 a. m. October 24, and ending 6 a. m. October 25, 1900.

Station.	Number of pieces, letters, circulars, and postals.	Weight of same.		Number of pieces, second, third, and fourth class.	Weight of same.	
		Lbs.	Oz.		Lbs.	Oz.
A.—Received	2,462	61		1,072	298	
Dispatched	1,659	36	6	416	157	
B.—Received	5,544	183		3,007	554	
Dispatched	3,801	70		1,416	259	
C.—Received	3,595	148		830	91	
Dispatched	390	98	8	88	7	8
D.—Received	8,032	325		2,316	753	
Dispatched	2,136	57		423	169	
E.—Received	4,283	146		2,582	460	
Dispatched	1,229	27		190	39	
F.—Received	3,160	57	8	2,306	247	
Dispatched	1,452	27		2,036	321	
G.—Received	200	6	2	98	19	7
Dispatched	78	2		25	3	4
H.—Received	1,250	40		629	275	
Dispatched	666	18		21	9	
I.—Received	2,971	86		802	198	
Dispatched	889	17		63	27	
K.—Received	571	15		376	111	
Dispatched	372	7	8	37	18	
L.—Received	608	18	14	337	116	8
Dispatched	256	7	15	194	64	8
M.—Received	486	15	10	423	69	
Dispatched	1,344	3,072	10	20	3	5
N.—Received	17,626	257		3,749	803	
Dispatched	11,168	317		3,427	339	
O.—Received	478	213		242	50	
Dispatched	155	23		36	6	

¹ Excessive weights at this station due to mailing of public documents by Congressman Shattuc.

STATION D AS A DISTRIBUTING CENTER.

Station.	Received.		Dispatched.	
	Pieces.	Weight.	Pieces.	Weight.
D.—Letters, circulars, and postals	8,032	<i>Pounds.</i> 325	2,316	<i>Pounds.</i> 57
Second, third, and fourth class	2,316	753	423	169
O.—Letters, circulars, and postals	478	213	155	23
Second, third, and fourth class	242	50	36	6
I.—Letters, circulars, and postals	2,971	86	889	17
Second, third, and fourth class	802	198	63	27
E.—Letters, circulars, and postals	4,283	146	1,229	27
Second, third, and fourth class	2,582	460	190	39
Total	21,706	2,231	5,121	365

STATION B AS A DISTRIBUTING CENTER.

Station.	Number of pieces, letters, circulars, and postals.	Weight of same.	
		Lbs.	Oz.
B.—Letters, circulars, and postals	5,544	183	
Second, third, and fourth class	3,007	554	
A.—Letters, circulars, and postals	2,462	61	
Second, third, and fourth class	1,072	298	
K.—Letters, circulars, and postals	571	15	
Second, third, and fourth class	376	111	
L.—Letters, circulars, and postals	608	18	14
Second, third, and fourth class	337	416	8
Total	13,977	1,357	6

STATION N AS A DISTRIBUTING CENTER.

Station.	Number of pieces, letters, circulars, and postals.	Weight of same.	
		Lbs.	Oz.
N.—Letters, circulars, and postals	17,626	257	
Second, third, and fourth class	3,749	803	
F.—Letters, circulars, and postals	3,160	57	8
Second, third, and fourth class	2,306	247	
Total	26,841	1,364	8

Statement of postal receipts for the month ending October 31, 1900, compared with the receipts for the month ending October 31, 1899, at the post-office at Cincinnati, Ohio.

Items.	For month ending October 31, 1899.	For month ending October 31, 1900.	Increase.	Per cent.
Sales of stamps, cards, stamped envelopes, wrappers, etc.....	\$91,504.64	\$108,370.86	\$16,866.22	18.43
Receipts from all other sources	8,336.28	9,773.79	1,437.51	17.24
Total.....	99,840.92	118,144.65	18,303.73	18.33

AMERICAN PNEUMATIC SERVICE COMPANY,
Boston, November 27, 1900.

J. M. MASTEN, Esq.,
Chairman of Post-Office Commission, Washington, D. C.
(Care of Hon. W. S. Shallenberger, Second Assistant Postmaster-General).

DEAR SIR: I beg to inclose copies of estimates of cost of construction, as well as of operating expenses, for the proposed pneumatic-tube systems for St. Louis, Mo., and Cincinnati, Ohio. The only variation which these figures would be subject to would be changes in market prices of materials and freight rates.

On the first sheet of each proposition is given the amount of power required for each line, as well as the cost. The best possible price for steam power that we can obtain in Cincinnati is \$50 per horsepower per year for ten-hour days. Assuming nineteen operating hours, the cost would be \$95 per horsepower per year. The same price applies to St. Louis.

All of which is respectfully submitted.

AMERICAN PNEUMATIC SERVICE COMPANY.
W. E. L. DILLAWAY, President.

Estimate and cost of power 10-inch pneumatic tube system for Cincinnati, Ohio.

	Horse-power.	Cost.
General post-office to Cincinnati, Hamilton and Dayton depot.....	46	\$4,370
General post-office to Pennsylvania Railroad Station	16	1,520
Cincinnati, Hamilton and Dayton depot to Station B.....	60	5,700
General post-office to Station D.....	94	8,930
Total.....		20,520

The above to be added to the estimate of general operating expenses.

Estimate of general operating expenses 10-inch pneumatic-tube system, using wheel carrier.

General post-office to Cincinnati, Hamilton and Dayton depot—Grand Central depot.

General post-office to Pennsylvania Railroad station.

Cincinnati, Hamilton and Dayton depot to Station B—Station at N.

General post-office to Station D—Station at Cincinnati, Lebanon and Northern depot.

[Operating hours, 4 a. m. to 11 p. m.]

One superintendent	\$900
One inspector	600
Two repair men, at \$780.....	1,560
Two substitutes, at \$600.....	1,200
Rent, repair shop.....	600
Power, repair shop.....	450
Telephones for all stations	600

Insurance.....	\$600
Rent at four stations, \$1,000 each.....	4,000
Light and heat at four stations, \$600 each.....	2,400
Power plants:	
Eight engineers (2 shifts), at \$780.....	\$6,240
One oiler; cleaning and repairing.....	600
Oil, waste, etc.....	1,000
	<u>7,840</u>
Operating expenses:	
Line general post-office to Cincinnati, Hamilton and Dayton depot.....	21,416
Line general post-office to Pennsylvania Railroad.....	10,558
Cincinnati, Hamilton and Dayton depot to Station B.....	24,039
General post-office to Station D.....	27,986
	<u>104,749</u>
Total.....	104,749

NOTE.—This estimate does not include taxes.

Estimate of cost of construction 10-inch pneumatic-tube system, general post-office to Cincinnati, Hamilton and Dayton depot.

[Distance, 7,450 feet.]

14,900 feet of 10-inch pipe, at \$1.12.....	\$16,688
14,900 feet of 10-inch pipe laid, at 30 cents.....	4,470
Excavation, 7,450 cubic yards, at \$2.....	14,900
Twelve sets bends, at \$170.....	2,040
Machine work.....	450
	<u>\$38,548</u>
Terminals:	
Four transmitters, at \$1,000.....	4,000
Four receivers, at \$500.....	2,000
One hundred carriers, at \$25.....	2,500
	<u>8,500</u>
	47,048
Power plant:	
Four compressors, at \$2,500.....	10,000
Foundations.....	3,200
Steam and air piping.....	6,000
Tanks and fittings.....	1,500
	<u>20,700</u>
	67,748
Engineering expense.....	1,000
Freight, cartage, etc.....	2,250
	<u>70,998</u>
10 per cent for contingencies.....	7,099
	<u>78,097</u>
Total.....	78,097

Estimated operating expenses 10-inch pneumatic-tube system, general post-office to Cincinnati, Hamilton and Dayton depot.

[Distance, 7,450 feet.]

Eight terminal attendants, at \$780 per year.....	\$6,240
Wear and tear account, 100 carriers per month, at \$2.10 per year.....	2,520
Depreciation on pipe line 5 per cent.....	1,927
Depreciation on power plant 10 per cent.....	2,920
Interest on investment 10 per cent.....	7,809
	<u>21,416</u>
Total.....	21,416

Estimate of cost of construction 10-inch pneumatic tube system, general post-office to Pennsylvania Railroad station.

[Distance, 3,350 feet.]

6,700 feet of 10-inch pipe, at \$1.12	\$7,504	
6,700 feet of 10-inch pipe laid, at 30 cents	2,010	
Excavation, 3,350 cubic yards, at \$2	6,700	
Eleven sets of bends, at \$170 per set	1,870	
Machine work	200	
		\$18,284
Terminals:		
Two transmitters, at \$1,000	2,000	
Two receivers, at \$500	1,000	
Fifty carriers, at \$25	1,250	
		4,250
		22,534
Power plant:		
Two compressors, at \$2,500	5,000	
Foundations	1,600	
Piping, steam and air	3,000	
Air tanks and fittings	750	
		10,350
		32,884
Engineering expense	500	
Freight, cartage, etc	1,200	
		34,584
10 per cent for contingencies		3,458
Total		38,042

Estimated operating expenses 10 inch pneumatic-tube system, general post-office to Pennsylvania Railroad station.

[Distance, 3,350 feet.]

Four terminal attendants, at \$780	\$3,120
Wear and tear account 50 carriers per month, at \$2.10 per year	1,260
Depreciation on pipe line, 5 per cent	914
Depreciation on power plant, 10 per cent	1,460
Interest on investment, 10 per cent	3,804
Total	10,558

Estimate of cost of construction 10-inch pneumatic-tube system, Cincinnati, Hamilton and Dayton depot to Station B, stop at Station N.

[Distance, 9,850 feet.]

19,700 feet of 10-inch pipe, at \$1.12	\$22,064	
19,700 feet of 10-inch pipe, laid, at 30 cents	5,910	
Excavation, 9,850 cubic yards, at \$2	19,700	
Ten sets bends, at \$170 per set	1,700	
Machine work	1,000	
		\$50,374
Terminals:		
Four transmitters, at \$1,000 each	4,000	
Four open receivers, at \$500 each	2,000	
One hundred and twenty-five carriers, at \$25 each	3,125	
		9,125
		59,499

Power plant;		
Four compressors, at \$2,500 each	\$10,000	
Foundations	2,400	
Steam and air piping	6,000	
Air tanks and fittings	1,500	
		\$19,900
		79,399
Engineering expense		1,500
Freight, cartage, etc.		3,000
		83,899
10 per cent for contingencies		8,390
Total		92,289

Estimated operating expenses, 10-inch pneumatic-tube system, Cincinnati, Hamilton and Dayton depot to Station B, stop at Station N.

[Distance, 9,850 feet.]

Eight terminal attendants, at \$780	\$6,240
Wear and tear account, 125 carriers per month at \$2.10, \$262.50 per year....	3,150
Depreciation on pipe line, 5 per cent	2,518
Depreciation on power plant, 10 per cent.	2,902
Interest on investment, 10 per cent.	9,229
Total	24,039

Estimate of cost of construction 10-inch pneumatic-tube system, general post-office to Station D, station at Cincinnati, Lebanon and Northern depot.

[Distance, 14,300 feet.]

28,600 feet of 10-inch tube, at \$1.12	\$32,032
28,600 feet of 10-inch tube laid, at 30 cents	8,580
Twenty sets of bends, at \$170 per set	3,400
Excavation, 14,300 cubic yards, at \$2	28,600
Machine work	1,300
	\$73,912
Terminals:	
Four transmitters, at \$1,000 each	4,000
Four open receivers, at \$500 each	2,000
Two hundred carriers, at \$25 each	5,000
	11,000
	84,912
Power plant:	
Four compressors, at \$2,500 each	10,000
Foundations	3,200
Steam and air piping	6,000
Air tanks and fittings	1,500
	20,700
	105,612
Engineering expense	2,250
Freight, cartage, etc.	4,500
	112,362
10 per cent for contingencies	11,236
Total	123,598

Estimated operating expenses 10-inch pneumatic-tube system, general post-office to Station D, station at Cincinnati, Lebanon and Northern depot.

[Distance, 14,300 feet.]

Eight terminal attendants, at \$780.....	\$6, 240
Wear and tear account, 100 carriers, at \$2.10 per month each, \$252 per year..	2, 520
Depreciation on pipe line, 5 per cent.....	3, 696
Depreciation on power plant, 10 per cent.....	3, 170
Interest on investment, 10 per cent.....	12, 360
Total.....	27, 986

Estimate and cost of power, 6 and 8 inch pneumatic-tube systems.

	Horse-power.	Cost.
General post-office to Cincinnati, Hamilton and Dayton depot (8-inch).....	62.5	\$5, 987
General post-office to Pennsylvania Railroad station (8-inch).....	29.1	2, 764
Cincinnati, Hamilton and Dayton depot to Station B (6-inch).....	130.0	12, 350
General post-office station to Station D (6-inch).....	112.0	10, 640
Total.....	338.6	31, 691

The above to be added to the estimate of general operating expenses.

Estimate of general operating expenses, pneumatic-tube system, using sliding carrier.

- General post-office to Cincinnati, Hamilton and Dayton depot—Grand Central depot (8-inch).
- General post-office to Pennsylvania Railroad station (8-inch).
- Cincinnati, Hamilton and Dayton depot to Station B—station at N (6-inch).
- General post-office to Station D—station at C., L. and N. depot (6-inch).

[Operating hours 4 a. m. to 11 p. m.]

One superintendent.....	\$900
One inspector.....	600
Two repair men, at \$780.....	1, 560
Two substitutes, at \$600.....	1, 200
Rent, repair shop.....	600
Power, repair shop.....	450
Telephones for all stations.....	600
Insurance.....	600
Rent at 4 railroad stations.....	4, 000
Light and heat at 4 railroad stations.....	2, 400
Power plants:	
Eight engineers at \$780.....	\$6, 240
One oiler, cleaning and repairing.....	600
Oil, waste, etc.....	1, 000
	7, 840
Operating expenses:	
Line general post-office to Cincinnati, Hamilton and Dayton depot....	24, 031
Line general post-office to Pennsylvania Railroad.....	12, 023
Cincinnati, Hamilton and Dayton depot to Station B.....	23, 201
General post-office to Station D.....	26, 253
Total.....	106, 258

NOTE.—This estimate does not include taxes.

Estimate of cost of construction, 8-inch pneumatic-tube system, general post-office, to Cincinnati, Hamilton and Dayton depot. Station at Grand Central depot.

[Distance, 7,450 feet.]

14,900 feet of 8-inch tube, at \$1.35	\$20,115	
14,900 feet of 8-inch tube, laid, at 30 cents	4,470	
Excavation, 5,794 cubic yards, at \$2	11,588	
Twelve sets of bends, at \$300 per set	3,600	
Forty-eight reducers, at \$50	2,400	
Machine work	450	
		\$42,623
Terminals:		
Four transmitters, at \$800 each	3,200	
Two closed receivers, at \$800 each	1,600	
Two open receivers, at \$400 each	800	
One hundred carriers, at \$18 each	1,800	
		7,400
		50,023
Power plant:		
Four compressors, at \$2,500 each	10,000	
Foundations	3,200	
Piping, steam and air	6,000	
Air tank and fittings	1,500	
		20,700
		70,723
Engineering expense	750	
Freight, cartage, etc	2,250	
		73,723
10 per cent for contingencies	7,372	
Total		81,095

Estimated operating expenses 8-inch pneumatic-tube system, general post-office to Cincinnati, Hamilton and Dayton depot, station at Grand Central depot.

[Distance 7,450 feet.]

Eight terminal attendants, at \$780 per year	\$6,240
Wear and tear account, 100 carriers per month at \$3.95, \$395 per year	4,740
Depreciation on pipe line, 5 per cent	2,131
Depreciation on power plant, 10 per cent	2,810
Interest on investment, 10 per cent	8,110
Total	24,031

Estimate of cost of construction 8-inch pneumatic-tube system, general post-office to Pennsylvania Railroad Station.

[Distance, 3,350 feet.]

6,700 feet of 8-inch tube, at \$1.35	\$9,045
6,700 feet of 8-inch tube laid, at 30 cents	2,010
Eleven sets of bends, at \$300 per set	3,300
Excavation, 2,233 cubic yards, at \$2	4,466
Forty-four reducers, at \$50	2,200
Machine work	200
	\$21,221

Terminals:

Two transmitters, at \$800 each	\$1, 600
One closed receiver	800
One open receiver	400
Fifty carriers, at \$18	900
	\$3, 700

24, 921

Power plant:

Two compressors, at \$2,500	5, 000
Foundations	1, 600
Piping, steam and air	3, 000
Air tank and fittings	750
	10, 350

35, 271

Engineering expense

500

Freight, cartage, etc

1, 200

36, 971

10 per cent for contingencies

3, 697

Total	40, 668
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Estimated operating expenses 8-inch pneumatic-tube system, general post-office to Pennsylvania Railroad Station.

[Distance, 3,350 feet.]

Four terminal attendants, at \$780	\$3, 120
Wear and tear account, 50 carriers per month at \$3.95, \$197.50 per year	2, 370
Depreciation on pipe line, 5 per cent	1, 061
Depreciation on power plant, 10 per cent	1, 405
Interest on investment, 10 per cent	4, 067

Total	12, 023
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Estimate of cost of construction 6-inch pneumatic-tube system, Cincinnati, Hamilton and Dayton depot to Station B, stop at Station N.

[Distance, 9,850 feet.]

19,700 feet of 6-inch tube, at \$1	\$19, 700
19,700 feet of 6-inch tube laid, at 25 cents	4, 925
250 feet brass bends, at \$10	2, 500
40 reducers, at \$25	1, 000
6,566 cubic yards excavation, at \$2	13, 132
Machine work	1, 000
	\$42, 257

Terminals:

Four transmitters, at \$500	2, 000
Two open receivers, at \$300	600
Two closed receivers, at \$500	1, 000
One hundred and twenty-five carriers, at \$15	1, 875
	5, 475

47, 732

Power plant:

Four compressors, at \$2,500	10, 000
Foundations	2, 400
Steam and air piping	5, 000
Air tanks and fittings	1, 200
	18, 600

66, 322

Engineering expense	\$1, 500
Freight, cartage, etc.....	3, 000
	<hr/>
	70, 832
10 per cent for contingencies	7, 083
	<hr/>
Total	77, 915

Estimated operating expenses 6-inch pneumatic-tube system Cincinnati, Hamilton and Dayton depot to Station B, stop at Station N.

[Distance, 9,850 feet.]

Eight terminal attendants, at \$780.....	\$6, 240
Wear and tear account 125 carriers per month, at \$3.10, \$387.50 per year....	4, 650
Depreciation on pipe line, 5 per cent.....	2, 113
Depreciation on power plant, 10 per cent.....	2, 407
Interest on investment, 10 per cent.....	7, 791
	<hr/>
Total	23, 201

Estimate of cost of construction 6-inch pneumatic-tube system general post-office to Station D, station at Cincinnati, Lebanon and Northern depot.

[Distance, 14,300 feet.]

28,600 feet of 6-inch tube, at \$1.....	\$28, 600
28,600 feet of 6-inch tube laid, at 25 cents.....	7, 150
600 feet of brass bends, at \$10.....	6, 000
9,533 cubic yards excavation, at \$2.....	19, 066
80 reducers, at \$25.....	2, 000
Machine work	1, 300
	<hr/>
	\$64, 116
Terminals:	
4 transmitters, at \$500 each	2, 000
2 open receivers, at \$300 each	600
2 closed receivers, at \$500 each	1, 000
200 carriers, at \$15 each.....	3, 000
	<hr/>
	6, 600
	<hr/>
	70, 716
Power plant:	
Four compressors, at \$2,500 each	10, 000
Foundations	2, 400
Steam and air piping	5, 000
Air tanks and fittings.....	1, 200
	<hr/>
	18, 600
	<hr/>
	89, 316
Engineering expense.....	2, 250
Freight, cartage, etc.....	4, 500
	<hr/>
	96, 066
10 per cent for contingencies	9, 607
	<hr/>
Total	105, 673

Estimated operating expenses 6-inch pneumatic-tube system general post-office to Station D, station at Cincinnati, Lebanon and Northern depot.

[Distance, 14,300 feet.]

Eight terminal attendants, at \$780.....	\$6, 240
Wear and tear account 100 carriers, at \$3.10 per month, \$310 per year	3, 720
Depreciation on pipe line, 5 per cent.....	3, 206
Depreciation on power plant, 10 per cent.....	2, 520
Interest on investment, 10 per cent.....	10, 567
Total.....	26, 253

THE BATCHELLER PNEUMATIC TUBE COMPANY,
Philadelphia, December 6, 1900.

HON. J. M. MASTEN,

Chairman Pneumatic Tube Investigating Committee, Washington, D. C.

DEAR SIR: We send you herewith our estimate of the cost of constructing and operating a system of pneumatic tubes proposed by your committee for the city of Cincinnati.

Some weeks ago we submitted a similar estimate to the local committee and your committee in Cincinnati. The earlier estimate contained several errors. You will please consider the inclosed as a revised estimate, which we substitute for the former.

Respectfully, yours,

BATCHELLER PNEUMATIC TUBE COMPANY,
J. E. MILHOLLAND, *President.*

THE BATCHELLER PNEUMATIC TUBE COMPANY,
Philadelphia, December 6, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
Cincinnati, Ohio:

GENTLEMEN: Replying to your request for an estimate of the proposed system of pneumatic tubes in the city of Cincinnati, we beg to submit the following. Our estimate comprises:

First. A double line of 8-inch tube connecting the central post-office with the Grand Central Railroad depot along the following route: From the central post-office the line should traverse the alley parallel to Fifth street to Central avenue, Central avenue to Third street, Third street to the Grand Central depot.

Second. A double line of 8-inch tube connecting the Grand Central with the Cincinnati, Hamilton and Dayton Railroad depot along the following route: From the Grand Central depot the line should traverse John street to Webb, Webb street to Baymiller, Baymiller to the Cincinnati, Hamilton and Dayton depot.

Third. A double line of 8-inch tube connecting the central post-office with the Pennsylvania Railroad depot along the following route: From the central post-office the line should traverse Main street to Fifth, Fifth street to Pike, Pike street to Friendship, Friendship street to Pennsylvania Railroad depot.

Fourth. A double line of 6-inch tube connecting the Cincinnati, Hamilton and Dayton Railroad depot with Postal Station N along the following route: From the Cincinnati, Hamilton and Dayton depot the line should traverse Baymiller street to Kenyon street, Kenyon street and an alley to Station N.

Fifth. A double line of 6-inch tube connecting Station N with Station B along the following route: From Station N the line should traverse Freeman avenue to Harrison, Harrison avenue to Station B.

Sixth. A double line of 6-inch tube connecting the central post-office with the Cincinnati, Lebanon and Northern Railroad depot along the following route: From the central post-office the line should traverse Main street to Sixth, Sixth to Broadway, Broadway and Eighth street to the railroad track, thence along the railroad track to the Cincinnati, Lebanon and Northern depot.

Seventh. A double line of 6-inch tube connecting the Cincinnati, Lebanon and Northern depot with Station D along the following route: From the Cincinnati, Lebanon and Northern depot the line should pass through the freight yards to the exit on Gilbert avenue and follow Gilbert avenue to Station D.

The length of these lines is given in the following table:

	Miles.
Line A, central post-office to Grand Central depot.....	0. 810
Line B, Grand Central depot to Cincinnati, Hamilton and Dayton depot.....	. 730
Line C, central post-office to Pennsylvania Railroad depot .....	. 810
Line D, Cincinnati, Hamilton and Dayton depot to Station N.....	. 454
Line E, Station N to Station B	1. 421
Line F, central post-office to Cincinnati, Lebanon and Northern depot.....	. 720
Line G, Cincinnati, Lebanon and Northern depot to Station D.....	1. 670
Total	6. 615
Total length of 8-inch lines	2. 350
Total length of 6-inch lines	4. 265

For the operation of all these lines we propose the erection of a central power station, to be located at some convenient point along the line of a railroad, at a distance not more than half a mile from one of the postal stations, preferably as near as possible to the center of the system. In this central power station we will erect boilers and engines with directly connected dynamos which will generate electric currents of high voltage. We propose the laying of underground conduits beside the tubes, with cables drawn into the conduits, by means of which electric power can be distributed to all the postal stations. In each postal station we propose the erection of air compressors or blowers driven by electric motors which will draw their energy from the central power station. In order that the electric cables for the distribution of power shall not be too large, a high voltage shall be used, with transformers at each postal station to transform from a high to a low voltage a sufficient amount of electric current to operate the motors in the respective stations.

The equipment of each station will include, besides the motors and transformers, switch boards and all necessary instruments. Each blower or air compressor will have an electric motor geared to it, which makes it very compact, occupying a small amount of space. Such a system of power distribution reduces the space occupied by the tube apparatus in the postal stations to a minimum. Furthermore, it avoids the use of steam engines and boilers in the post-office.

For the line equipment we propose the use of cast-iron tubes, bored smooth and accurate on the interior, and similar in all respects to the tubes now in use in New York and Philadelphia and Boston. The carriers will travel upon bearing rings composed of a material selected by us after long experience. We adopt this construction of a bored tube and a sliding carrier from the following considerations: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design, which results in giving the tube an enormous carrying capacity, so that, for example, an 8-inch tube may be used for a service that would otherwise require a 10-inch tube.

Within the postal stations we propose the use of our latest improved transmitters and receivers. The transmitters will be of an improved type, much more compact and simple in operation than those now in use by the Government. The receivers will be of a new and simplified type which permits of having the end of the tube open so that carriers are free to come out, however frequently they may be dispatched. There is no mechanism to get out of order and interrupt the passage of the carriers from the tube to the receiving table. We can not lay too much emphasis upon the use of this improved type of receiver. It increases the capacity of the line two to three times by allowing the carriers to be dispatched so much more frequently and the carriers are brought to rest gradually without shock, avoiding the danger of injury to fragile articles. Several of these receivers have been constructed, one of which was on exhibition at the Paris Exposition.

There is no element of a pneumatic-tube system upon which success depends to so great an extent as upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched, and emptied at each station during the day. Lightness, simplicity, and facility of opening are essential qualifications. The carriers proposed by us will be similar in design to those used in connection with the present existing lines constructed by this company in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds, and will open for its full diameter at the rear end. The latter feature greatly facilitates filling and emptying as compared with a carrier opening at the side. We find that the friction of the carrier in traveling through the tube is inconsiderable. Our preference for this type of carrier would not be altered if the friction were considerable, for at its maximum the friction of the carrier is

small compared with that of the column of air. The bearing rings of the carrier travel 10,000 miles without renewing, and as they fit closely to the walls of the tube they reduce the leakage past the carrier to a minimum.

When the system is installed, carriers can be dispatched at the rate of ten per minute; therefore the capacity of each section of an 8-inch line will be 6,000 per minute, or 360,000 letters per hour in each direction. The capacity for mail of other classes will of course be somewhat less. The average speed of the carrier will be about 44 feet per second; therefore the time of transit of a carrier between the central post-office and the Grand Central Railroad depot will be one minute and thirty-six seconds.

Of course it is impossible to give an accurate estimate of the cost of constructing such a system until the rights of way have been obtained and the ground purchased for the erection of a power house. We have estimated, however, as carefully as possible that the complete system above described can be installed for the sum of \$522,267.96.

This assumes that the ground for the central power station can be purchased for \$4,000 and the building erected for \$8,000. No allowance has been made for the cost of obtaining rights of way or of changing existing underground construction.

The following tables contain an itemized statement of the cost of constructing this entire system as we have estimated it:

Cost of construction.

ENGINEERING EXPENSES.

One chief engineer	\$3,000.00
One first assistant engineer.....	1,800.00
One second assistant engineer.....	1,200.00
Two inspectors.....	1,440.00
Chief draftsman.....	1,200.00
Four draftsmen (six months).....	1,440.00
One instrument.....	150.00
Drawing-room supplies.....	375.00
Total (one year).....	10,605.00

OFFICE EXPENSES.

Bookkeeper.....	\$780.00
Stenographer.....	624.00
Office boy.....	208.00
Office rent.....	1,300.00
General expenses.....	600.00
Furniture.....	500.00
Total (one year).....	4,012.00

CENTRAL POWER STATION.

Ground.....	\$4,000.00
Building.....	8,000.00
Chimney.....	2,000.00
Engines and dynamos.....	35,000.00
Boilers.....	6,500.00
Condensers.....	3,500.00
Pumps.....	500.00
Foundations.....	2,000.00
Steam and water piping.....	3,250.00
Switch boards.....	1,500.00
Wiring, lighting, and transformers.....	400.00
Traveling crane.....	1,200.00
Plumbing and gas fitting.....	250.00
Repair equipment.....	2,000.00
Furniture.....	100.00
Telephone exchange.....	250.00
Total.....	70,450.00

Equipment of postal stations.

CENTRAL POST-OFFICE.

Two transmitters, 8-inch tube.....	\$2,000.00
One transmitter, 6-inch tube.....	900.00
Two receivers, 8-inch tube.....	1,400.00
One receiver, 6-inch tube.....	600.00
Three compressors, 8-inch tube.....	7,500.00
Two compressors, 6-inch tube.....	4,000.00
Piping.....	3,450.00
Five foundations.....	1,250.00
Erection.....	825.00
Plumbing.....	225.00
Lockers.....	150.00
Repair of building.....	300.00
Two tanks, 8-inch.....	230.00
One tank, 6-inch.....	85.00
One telephone.....	25.00
Three electric motors, 20 horsepower.....	2,045.43
Two electric motors, 15 horsepower.....	1,320.00
Ten transformers.....	1,602.50
One switch board.....	307.07
Three telephone cable heads.....	24.00
Total.....	28,239.00

SUMMARY.

Central post-office.....	\$28,239.00
Grand Central Depot.....	18,535.62
Cincinnati, Hamilton and Dayton Railroad Depot.....	20,985.97
Pennsylvania Railroad Depot.....	11,685.31
Station N.....	16,079.42
Station B.....	10,407.59
Cincinnati, Lebanon and Northern Railroad Depot.....	17,190.19
Station D.....	11,316.69
Total.....	134,439.79

Construction of lines.

LINE A (8-INCH)—CENTRAL POST-OFFICE TO GRAND CENTRAL DEPOT.

8,110 feet iron tubing, at \$1.50.....	\$12,162.00
26 brass bends, at \$250.....	6,500.00
82 short lengths, at \$1.....	82.00
13 dutchmen, at \$75.....	975.00
17 drips, at \$32.....	544.00
4,250 feet trench, at \$1.40.....	5,950.00
Entering tubes in post-office.....	1,000.00
612 square yards paving (asphalt), at \$2.25.....	1,377.00
528 square yards paving (granite), at \$1.80.....	950.40
1,000 square yards paving (brick), at \$1.80.....	1,800.00
278 square yards paving (cobble), at 50 cents.....	139.00
4,250 feet power cables, at 67 cents.....	2,847.50
4,250 feet telephone cables, at 15.1 cents.....	641.75
4,250 feet conduits, at 39 cents.....	1,657.50
12 manholes.....	600.00
Total.....	37,226.15

SUMMARY.

Line A, central post-office to Grand Central depot.....	\$37,226.15
Line B, Grand Central depot to Cincinnati, Hamilton and Dayton depot.....	31,108.35
Line C, central post-office to Pennsylvania Railroad depot.....	33,864.10
Line D, Cincinnati, Hamilton and Dayton to Station N.....	16,760.15
Line E, Station N to Station B.....	41,669.50
Line F, central post-office to Cincinnati, Lebanon and Northern Depot.....	25,881.30
Line F, Cincinnati, Lebanon and Northern depot to Station B.....	49,488.10
Total.....	235,997.65
Installation of electrical equipment.....	1,000.00

CONDUITS AND CABLES.

From power house to nearest station, including excavating, filling, and paving trench (2,640 feet).....	\$4,956.45
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CARRIERS.

156 8-inch carriers, at \$20.....	\$3,120.00
132 6-inch carriers, at \$15.....	1,980.00
Total.....	5,100.00
Freight on apparatus to Cincinnati.....	8,228.16

Cost of construction.

FINAL SUMMARY.

Central power station.....	\$70,450.00
Equipment of postal stations.....	134,439.79
Construction of lines.....	235,997.65
Installation of electrical equipment.....	1,000.00
Conduits from power house to nearest station.....	4,956.45
Engineering expenses.....	10,605.00
Office expenses.....	4,012.00
288 carriers.....	5,100.00
Freight on apparatus to Cincinnati.....	8,228.16
10 per cent to the Batcheller Pneumatic Tube Co.....	47,478.91
Total.....	522,267.96

Cost of operation.

The cost of operation, based on twenty hours a day and three hundred and ten days in the year, has been estimated as follows:

Superintendence.....	\$3,420.00
Office expenses.....	2,236.00
Office labor.....	1,612.00
Stations, labor.....	21,600.00
Power-station labor.....	3,060.00
Coal.....	5,029.00
Water.....	456.00
Supplies.....	2,050.00
Ashes removed.....	160.00
Repair-shop labor.....	2,836.50
Auxiliary power.....	173.00
Carrier repairs.....	1,827.50
Machinery supplies.....	375.00
Repair supplies.....	2,250.00
Taxes.....	1,200.00
Insurance.....	1,050.00
Total.....	49,335.00

The above estimate for the central power station includes the items of coal and water, the hauling of ashes, and the salaries of two enginemen, and two firemen, which is a minimum complement of attendants.

All of the stations combined require twenty-four operators and twelve compressor men. The administrative expenses include the salaries of the general superintendent, bookkeeper, stenographer, and the cost of stationery, postage, and office supplies, office rent, and charge for telephone services.

We have estimated taxes and insurance upon the central power station, but this does not include the taxes upon tubes and machinery, which may be taxed as personal property. We have included no tax upon the item of franchise.

The expense of the repair shop includes the salaries of a master mechanic, one machinist, one electrician, and one helper, together with the cost of bearing rings for carriers and machine parts to replace those broken or worn out.

The item of supplies covers oil and waste, a considerable quantity of which will be necessary.

Basing the rental to the Government upon the net operating expenses and 10 per cent of the cost of construction, the annual rental will be:

Operation.....	\$49,335.00
10 per cent of construction.....	52,226.80
Total.....	101,561.80

This sum (\$101,561.80) will be our annual charge for the service, predicated upon the above estimate.

We desire to emphasize the fact that the above estimate of the cost of operation, which constitutes nearly 50 per cent of the rental just named, is based upon the assumption that we are to operate the system independent of the post-office, furnishing all supplies and labor; no assistance whatever to be rendered by post-office employees in the handling of the carriers. It should be pointed out that the labor performed at the stations will in no case be sufficient to occupy the entire time of the man to be stationed there by us. If this man were a post-office employee he could be engaged upon post-office work during the interval when he would otherwise be idle.

We will also say that in many cases, when the exact circumstances are known, it may be possible to dispense with the compressor men.

Under the most favorable circumstances therefore the item \$21,600, for station labor, might be materially reduced by governmental operation.

Respectfully submitted.

J. E. MILHOLLAND,
President, Batcheller Pneumatic Tube Company.
per B. C. B.

WASHINGTON, December 8, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The general committee on pneumatic-tube service have received from the American Pneumatic Service Company of Boston and the Batcheller Pneumatic Tube Company of Philadelphia amended or modified propositions of the proposed tube service in Cincinnati, previously considered and reported upon by the joint committee from Cincinnati under date of November 21, 1900.

The proposition of the first-named company provides for the necessary power, omitted in their first estimates. It calls for an annual rental of \$137,949 for the 8-inch and 6-inch system, and \$125,269 for the 10-inch tubes.

We have not attempted to revise the estimates, as they are not sufficiently defined to make this practicable.

The proposition of the Batcheller Pneumatic Tube Company proposes an annual rental of \$101,561.80, being \$9,169.40 less than their first estimates. This rental is the sum of the operating expenses, \$49,335, and 10 per cent of the cost of construction, i. e., \$52,226.80.

It is our opinion that the rental asked by the Batcheller Company may be reduced from \$101,561.80 per annum to, approximately, \$80,230 per annum. This reduction may be secured as follows:

Erecting power station in the Government post-office building, where there is ample space in the basement, \$22,156, representing, at 10 per cent per annum, rental to the amount of.....	\$2,215
Utilizing time of post-office clerks in the receipt and dispatch of tube carriers, cutting down company's estimates from 36 men to 13, at \$600 each per annum.....	13,800
Reducing from 10 to 5 per cent the allowance to company for the payments advanced in engineering and office expenses, freights, and Batcheller patents and royalties, total \$70,323, at 5 per cent.....	3,515
Total.....	21,331

The sum of \$21,331 deducted from \$101,561.80 per annum, leaves \$80,230.80 annual rental required for the 6.61 miles of 8 and 6 inch tube service connecting three depots and three branch offices.

We recommend the consideration of the amended proposition submitted herewith from the Batcheller Pneumatic Tube Company, and consider it as generally reason-

able. The modifications suggested depend not upon the company's initiative, but rather upon the Department accepting our view and acting in conjunction with the Treasury Department to make them practical of accomplishment.

Very respectfully,

J. M. MASTEN, *Chairman*,
E. W. ALEXANDER,
General Committee.

CHICAGO.

GENERAL POST-OFFICE,
BUREAU OF CORRESPONDENCE, EXECUTIVE DIVISION,
Chicago, Ill., November 17, 1900.

Hon. CHARLES EMORY SMITH,
Postmaster-General, Washington, D. C.

SIR: Departmental Orders, No. 989, August 13, 1900, specifically directs the postmaster of Chicago and the superintendent of the sixth division, Railway Mail Service, with headquarters at Chicago, to—

1. Proceed at once to a careful local investigation as to the necessity for a pneumatic-tube service for the transmission of mails. * * *
2. Having special reference to the volume of mail passing between the points where the installation for the service may be recommended.
3. The size of the tube deemed necessary for present and prospective demands of the postal service.
4. The space that may be available at terminal points and intermediate stations for the installation of the plant.
5. The most economical and practicable system both as regards installation and maintenance.
6. And all other facts pertinent to the general investigation contemplated by Congress.

Your order further states:

It is not assumed that the local committee, constituted as above, will necessarily report favorably upon the installation of any system of pneumatic tubes, but they will, on the contrary, prepare their report with reference to the needs of the service and the best interests of the Government, giving due consideration to the question as to whether the carriage of mail by pneumatic tube or other similar device should be recommended between any given points. These investigations may include the possible use of single lines of small tubes as feeders to the trunk lines, and the question as to whether additional postage could be collected on first-class matter transmitted through the tubes.

In addition to the foregoing the honorable Second Assistant Postmaster-General, in a letter dated August 22, responding to an inquiry from the chairman of the committee, asking for instructions on certain points, directs:

7. The first question to be considered would seem to be the need of improved methods of transportation for mail between given points.
8. Second, the volume of mail matter passing between said points, first-class mail especially.
9. Third, the advantages to be derived to the postal service from the underground carriage of such mail in reducing the time of trips, affording greater security, and avoiding delays by reason of congested surface travel, etc.
10. When you have reached the conclusion that, for the reasons named, you would feel justified in urging the Department to secure authority from Congress for additional outlay to provide an underground system by pneumatic tube or other similar device, then it would seem proper for you to ask the attention of companies operating or proposing to operate pneumatic-tube systems to confer with you as to the points to be connected, volume of mail to be handled, schedules to be adopted, and expect such companies to indicate the most economical routes to be taken, the streets through which they would pass, the character of the plant they would install, the amount of space at terminal points and stations they would require, etc.

The local committee held its first session and organized September 17, 1900. The question propounded by the honorable Second Assistant Postmaster-General was considered:

7. The first question to be considered would seem to be the need of improved methods of transportation for mail between given points.

The committee agreed that there is an imperative need for quicker methods of transmitting mail for local delivery and dispatch. The present service was then canvassed and it was found that mails are now transmitted by—

- (a) Steam railroads, railway post-offices, and express trains.
- (b) Street-car railway post-offices.
- (c) Wagon service to depots, street-car railway post-offices, and stations.
- (d) Foot messengers between steam roads and stations.

It was further shown that before 1894 the local service was performed entirely by steam roads and wagons. On July 1, 1894, during the great strike, street-car messengers were employed to carry first-class mail to stations, and the street cars were used as the means of transportation. A distinct improvement in the dispatch of first-class mail was effected by the messenger service, which was conducted with good results until the introduction of the street-car railway post-offices in 1895, when it was practically superseded.

PRESENT STREET-CAR SERVICE.

The street-car railway service was transferred to the local postal authorities July 1, 1900. In the present year an entirely new line has been introduced on Wentworth avenue; the North Clark Street Line has been extended from Lakeview to Evanston, and the Milwaukee Avenue Line to Logan Square Station.

The street-car railway postal service now consists of a cable line on the West Side 5.29 miles in length, extending to Garfield Park, and supplying five carrier stations; an electric line in the northwest division 5.66 miles in length, extending to Logan square, and supplying four stations; an electric line on the North Side 12.61 miles in length, extending to Evanston, supplying five stations and the Evanston post-office; on the South Side a cable line 7.15 miles in length, extending from the general post-office to Hyde Park, and supplying three stations, and an electric line on Wentworth avenue and Clark street 8.38 miles in length, extending from the general post-office to Stock Yards and Englewood stations, and supplying five stations.

The street-car service undoubtedly has been an immense improvement on all preceding services. It provides for an hourly dispatch of mail to all the stations on the lines and, in conjunction with the steam roads, permits a complete and frequent interchange of mails between all stations and the general post-office during the day. Latterly, the value of the street-car railway service has been further increased by the fact that the cars are now largely used to convey the collections of the carriers to the general post-office and its stations.

EFFECTIVENESS OF THE LOCAL SERVICE.

Despite these improvements the speed at which local mails are interchanged, compared with the speed with which mails are carried by the railroad post-offices, leaves a great deal to be desired.

The effectiveness of the delivery and collection service depends on the effectiveness of the intermediate or transmitting service, whether by street-car railway post-offices, wagons, or messengers.

The intermediate or transmitting service is not eminently effective, and local and incoming mail can not be connected and delivered as promptly as the public requires. The growth of the public messenger systems and the rapid development of the local telegraphic business are tangible evidences that the postal service locally is not completely meeting the wants of the public in respect to the rapid handling of certain classes of mail.

The special-delivery service, which is intended to fill these wants, is only partially effective, first—

(e) Because the fee is not sufficient to insure immediate delivery anywhere and at any time; and second—

(f) Because no provision is made for the special collection and dispatch of mail requiring immediate delivery.

In the dispatch and delivery of ordinary mail intended for local delivery the present service falls short of the best facilities. One pertinent example will suffice to show the necessity for quicker and better means of transmitting mail.

DEFECTS OF PRESENT SERVICE.

Many of the principal railway post-offices which make up letter mail directly to carriers in the downtown stations arrive in the Chicago depots either just before the first or just before the second morning trip of the letter carriers. Under the present system of getting mail to the downtown stations by wagons (whose movements, on account of congested streets, swung bridges, etc., are necessarily slow), the made-up letter mail does not connect closely with the trips of the carriers, and a large proportion of it loses either the first or second morning delivery and is delayed in the neighborhood of an hour and a half.

On September 26 the made-up letter mail on the incoming railway post-offices intended for delivery through the Central Station, Chicago post-office, was weighed, and the report shows that 1,276 pounds were received between the hours of 6.55 and 8 a. m. These represented about 63,800 pieces of first-class mail, which, in the main, could have been delivered one and one-half hours earlier than they were had there been some speedy, direct, and effective way of transmitting mail from the depots to the station of delivery. Later it will be shown how this condition delays the delivery of mail in every station in the city, the delays being greater in proportion to the distance of the delivery stations from the railway depots.

CHARACTER OF IMPROVED SERVICE.

The members of the committee, having satisfied themselves of "the need of improved methods of transportation," the question indicated as No. 1 in the instructions of the honorable Postmaster-General was taken up for consideration:

Proceed at once to a careful local investigation as to the necessity for a pneumatic-tube service for the transmission of mails.

Question No. 1, in connection with the further instructions contained in the same order—

It is not assumed that the local committee, constituted as above, will necessarily report favorably upon the installation of any system of pneumatic tubes, but they will, on the contrary, prepare their report with reference to the needs of the service and the best interests of the Government, giving due consideration to the question as to whether the carriage of mail by pneumatic tube or other similar device should be recommended between any given points—

was understood to mean that the committee should examine all methods or systems for the speedy transmission or transportation of mails that might be presented, and accordingly this was done.

It was found early in the inquiry that while a system of underground conveyance of mails in pouches by electric cars or carriers is apparently possible, yet the prospect of a system being actually established and operated seemed more or less remote.

The pneumatic-tube system is in actual operation in the postal service in certain cities of the United States, and is immediately available, which gives this system a practical advantage over all others. The advantage, however, of an underground system which will convey all classes of mail in bulk between depots and stations ought not to be lost sight of, and our investigation makes it plainly evident that within measurable time some such system may become available in Chicago.

The local committee at the outset of the investigation invited all those who had plans for rapid underground transportation of mail to attend the meeting and explain the merits of their systems. The details of these meetings are given here because they are of importance to a proper understanding of the subject.

SECOND MEETING OF COMMITTEE.

At a second meeting of the committee, held September 17, there were present, in addition to the members, B. C. Batcheller and W. R. Kerr, of the Batcheller Pneumatic Tube Company; Edmond A. Fordyce, of the American Pneumatic Tube Service Company, and N. Sampson, of the Sampson Combined Curb and Conduit Company; Assistant Postmaster Hubbard, and Superintendents Daniel P. Cahill (appointed secretary to the local committee) and George E. McGrew.

Mr. Batcheller was asked to speak before the committee on the question of transporting mails through pneumatic tubes, and the following is what he said:

In the first place, the mail, as I understand it, is divided into three classes—mail-station service; that is to say, the transportation of mails between the branch post-offices and the general post-office and other points of the city.

The transportation of mail between railway stations—mail that is not opened or intended for the city.

The transportation of mails between the railway stations and the general post-office—mail intended for the city and mail which has to be opened, distributed, and dispatched out of the city.

The last two classifications probably include the greater portion of the mail; that is to say, there is much more mail brought into and sent out from the general post-office from railway depots than from local stations.

Now, the question before us is the application of the pneumatic-tube service to the transportation of mail. Of course, we as a company do not claim for our system that it will do everything. There are places where the wagon service is probably more rapid, or as rapid, but there are cases where the pneumatic tube will facilitate matters. The most important application of the tube, in my estimation, is for station service; that is to say, between the general post-office and the various branch offices. The reasons for this are several. In the first place, the mail can be kept moving

more constantly. At the railway stations it arrives in large bulk as the trains come in; but between the local stations, in addition to the mails arriving from outside the city, which are considerable, there is a large amount of mail to be interchanged. Now, this can be kept from accumulating by the more frequent dispatches which the tubes can give as compared with dispatches by trolley cars or wagons.

In the second place, the pneumatic tube in this connection will facilitate the delivery of letters bearing special-delivery stamps. The special-delivery system has been in use for some ten or twelve years, but the number of letters carried is still comparatively small. There is no reason why the post-office should not do the business now done by district messenger boys. By the use of tubes the special-delivery letters can be sent to different parts of the city quicker than the telegraph service can send messages. The development of the special-delivery business through pneumatic-tube service is particularly important, as it will greatly increase the revenue of the post-office. I have no doubt that the increased revenue from the sale of special-delivery stamps would eventually pay for the installation and rental of a local pneumatic-tube system. I understand the Government gets 2 cents and the boy 8 cents for each letter, but by the use of the tube the business would so increase that the boy could be given 5 cents and the Government 5 cents, and both the Government and the boy could make more than they do now. This would be one source of increased revenue from the pneumatic-tube system, and another would come from the general increase in business. Stations in New York and Philadelphia, I understand, have realized a considerable increase in business by the introduction of the tube system. While I have no figures at hand to show this increase, I am told that the revenue of the postal station in the Bourse at Philadelphia has greatly increased since the installation of the tube system.

In regard to the application of the tubes to the service in this city in connection with the stations, my opinion is that a 6 or 8 inch tube would be large enough to serve all the stations. These would answer for all the first-class mail, and I think it would handle newspapers and all other mail not too large for the tubes.

It would not be advisable, in my opinion, to put in a tube larger than 8 inches in diameter for the purpose of carrying large pieces of mail, as the cost would be too great to warrant the outlay.

Asked concerning the relative cost of the 6 and 8 inch tubes, Mr. Batcheller replied that it was about as 6 to 8.

Concerning the relative advantages of the 6 and 8 inch tubes, he said the advantages of the 6-inch tube lie in the fact that light packages can be carried much quicker; also in the cost of construction and operation. On the other hand, the 8-inch tube has three times the capacity of the 6-inch tube, and the carriers can be dispatched nearly as quickly as in the 6-inch tube. It would not take more men to handle the same amount of mail for the 8-inch than for the 6-inch tube.

Mr. Hubbard then interrogated Mr. Batcheller, inquiring:

How long is the longest line operated by your company?

Mr. BATCHELLER. From the New York post-office to Station H, Fourty-fourth street, about 4 miles. This is an 8-inch tube.

Mr. HUBBARD. Has any test ever been made for, say an hour, of the number of carriers which can be sent over that line?

Mr. BATCHELLER. That is a peculiar line and there are several stations on it; to operate the line necessitates a slight headway between the carriers of 15 to 18 seconds, especially where there are several stations on the line, which limits the speed. Four carriers per minute can be dispatched over that 4-mile line. Since that line was put in we have made great improvements in our system. We have now devised different terminal apparatus for the system whereby we can dispatch carriers much more rapidly than by that line. We can reduce the headway from 15 to 8 seconds or 6 seconds, and instead of dispatching 4 carriers per minute can dispatch 10.

Mr. HUBBARD. What is the number of pieces which can be put into a carrier?

Mr. BATCHELLER. Six hundred ordinary letters, but in ordinary use they are never filled. For twenty-four hours the average would probably be considerably less. I think the average would be in the vicinity of 500 letters for each carrier, at the rate of 10 carriers per minute if the office is busy. The New York line operated under a headway of 15 to 18 seconds is used to about 23 per cent of its capacity. It could do four times as much work as it is doing if the mail was there to be sent.

Mr. HUBBARD. What is the amount of floor space required to operate the tube at the terminal?

Mr. BATCHELLER. We have a variety of designs of terminal apparatus—some small and some large. The design I have in mind for the 8-inch tube could be set into a space about 15 by 15 feet—225 square feet. Usually two or three terminals in one room are so arranged that they fit into each other or overlap, so that four could probably be got into the space of 500 square feet. The apparatus could be changed to fit the circumstances.

Mr. HUBBARD. How many men are necessary in New York at the terminals?

Mr. BATCHELLER. At the busiest times 2 men are employed to receive and dispatch the carriers, their business being to close and dispatch and receive and open the carriers. These men are furnished by the company.

Mr. HUBBARD. Are trained or special men necessary for the operation of the tubes?

Mr. BATCHELLER. No; I think not. It was found advisable by the company to have specially trained men because of the fact that when it was first introduced, being of an experimental nature, the company desired full control of its operation.

Mr. HUBBARD. Do you think it would be any obstacle at all to the Government owning the various lines on account of having experts to operate them?

Mr. BATCHELLER. No, sir; I do not. It would probably only require occasional inspection and ordinary care.

Mr. KERR. Did not the Government at first operate the lines and then later turn them over to the company?

Mr. BATCHELLER. I understand the Brooklyn line was started this way, but some question arose and it was turned over to the company.

Mr. GORDON. How long is the Brooklyn line?

Mr. BATCHELLER. One and three-quarters miles.

Mr. HUBBARD. You favor the operation of the pneumatic tube as between the post-office and its stations rather more than you would between the post-office and railway stations?

Mr. BATCHELLER. I think the greatest benefit would be derived by the application of the system to the post-office and its stations, but there would be benefit in the use of same between the general post-office and railway stations.

Mr. HUBBARD. Have you ever taken into account what the dimensions of the tube must be to take in the Government pouches as locked out in the post-office?

Mr. BATCHELLER. The pouches vary a great deal in size. If you desire a tube to accommodate the large (18-inch) pouches, it would probably require a tube 25 inches in diameter. I do not think it would be practicable to use one less than 24 inches. It is possible to construct such a tube, but it would be very expensive. A great disadvantage would be that a tube of that size could not be terminated in the workroom. It would have to be in the basement, and would need a great deal of room. It would probably have to have tracks or mechanical contrivances of some kind. The mail would have to be received in the basement, taken up to the proper floor, etc., as is now the case in the use of wagons. The advantage of the tube over the wagons is not alone in the speed, but in the fact that the mail can be delivered to and taken from the tables in the workroom, thus avoiding the handling to and from wagons. The time saved by having the terminus in the workroom is as great as that saved by speed in transmission.

Mr. HUBBARD. Suppose, for sake of argument, we conclude that the pneumatic-tube system as it has been instituted, and its efficiency developed by improvements made since that time—suppose we admit that for service between stations the pneumatic tube would just fill the bill, would it not be practicable to think of a system that might be better than the wagon service to the railway station?

Mr. BATCHELLER. Well, this is a matter I have not considered.

Mr. Batcheller mentioned the systems of London and Paris, where tubes of $2\frac{1}{4}$ and 3 inches are used; said in London nothing but telegrams are handled, while in Paris telegrams and a special form of letter are transmitted.

Mr. HUBBARD. Mr. Batcheller, what is the largest tube in use?

Mr. BATCHELLER. The 8-inch tube is the largest used up to the present time for the dispatch of mail.

Mr. GORDON. What would be the comparative cost of the 3-inch system in Chicago and the 6 and 8 inch tubes?

Mr. BATCHELLER. I am not prepared to answer that question.

Mr. GORDON. What arrangements have you with the Government for the use of the tubes in Boston, Philadelphia, and New York?

Mr. BATCHELLER. The Batcheller Company has no contracts with the Government. Local companies are formed in the different States to handle such business.

Mr. GORDON. Have you made any figures as to the approximate cost of the system as represented by your sketch?

Mr. BATCHELLER. No. I would very much prefer to have your committee make up and approve a plan and submit it to us, when we will be glad to make up a special estimate and present figures. It takes a good deal of time and is also expensive to get up such estimates, and I would rather have you settle on a plan before doing anything in this direction. It would be necessary for us to know the length of the service expected from the tubes. For instance, if twenty hours, we would have to make two shifts of ten hours each; or if sixteen or twenty-four hours we would have to make eight-hour shifts.

Asked as to the speed of the carriers, Mr. Batcheller stated that it was 44 feet per second, 30 miles an hour, and this speed was gained instantaneously upon the carriers being placed in the tube and continued until delivered at the terminus.

Mr. Cahill asked:

What actual advantages would arise from the use of the tubes in dispatching mail to stations when it is understood that at most of the stations the deliveries range from two to four a day, and when it is clear that all mail can be connected with these stations by wagons or street cars up to within an hour of the delivery.

Mr. Batcheller replied that the advantage would come from the later connections that could be given and from the fact that mail could be dispatched continuously instead of being held for a particular wagon or street-car dispatch.

Mr. Montgomery said:

A great advantage would come from the ability to deliver special letters at any time, and even in the case of ordinary letters the public would utilize the tube service instead of the present private messenger service.

He also thought that while the tubes would be a good thing for the interchange of mails between local postal stations, they would not be greatly advantageous in connection with the sending of mails to the railway depots.

Mr. Kerr, of the Batcheller Pneumatic Tube Company, said:

The practical operation of the system is very different from the theoretical. I studied the system in New York for a long time. I had access to the clerks, superintendent of mails, superintendent of the Railway Mail Service, and everybody in the office. I think the whole matter may be embodied in an illustration which I desire to make with reference to the use of pneumatic tubes as against wagons or street cars: For example, in New York, previous to the installation of tubes, if you mailed a letter to Brooklyn at 10, 11, or 12 o'clock you could never get an answer before next day. Now you can mail a letter at Station H uptown with a special-delivery stamp and get an answer in an hour. We have sent a letter by messenger boy, by tube, and a telegram all at the same time, and in each case the tube has beaten the telegram and the boy. From a commercial side of the system, the total number of special-delivery letters handled by New York was about 300,000 per year. The Department receives 10 cents postage and pays out 8 cents for the delivery, that leaves the office 2 cents on each letter, or \$6,000 a year for special-delivery letters. Now, the telegraph business around Manhattan alone and the messenger service can be 95 per cent of it, done by the tube system.

Mr. GORDON. Have you ever looked into the figures on this subject?

Mr. KERR. I am looking into them now.

Mr. Kerr then spoke of the messenger and telegraph service being done down town and the stock yards, and said it could nearly all be done by the tube service, and cited the charges for messages and telegrams as against those for special-delivery letters.

Mr. GORDON. Mr. Batcheller, have you ever contemplated putting the tube system under a river.

Mr. BATCHELLER. No.

Mr. GORDON. Would it be economy to hire a pneumatic-tube system from a pneumatic tube company, or for the Government to buy the right?

Mr. BATCHELLER. I think it would be economy for the Government to buy the right.

Mr. Kerr said:

I differ with Mr. Batcheller's views on this subject, on the ground that I have never known of a municipal plant which did not cost all of 25 per cent more to operate it than it could be run for by private persons. Our company is prepared to make prices for the use of the system by the Government. To install tubes in the cities contemplated by the Government would mean an expenditure to the Government of somewhere between \$25,000,000 and \$50,000,000. We made a proposition to Congress at the last session to fully equip 27 of the principal cities of this country and carry the Government mails for \$2,525,000 per annum. We will install a plant in any city you may name over any route and for rental will charge you 10 per cent on the actual cost of construction with the addition of the operating expenses, the Government to appoint an engineer, and the rental to be based on his estimate of the cost.

Mr. Gordon asked if it would not be feasible for the Government to obtain a franchise and sublet to the company. Mr. Kerr said it would not, as the company would be unable to float its bonds.

SECOND MEETING OF COMMITTEE.

Friday, September 21, the committee held its second meeting. In addition to the members of the committee there were present, Superintendent McGrath, Superintendent Marr, Superintendent Cahill, W. R. Kerr, of Batcheller Pneumatic Tube Company; Max Frank, of the Chicago Electrical Institute; Edmond A. Fordyce, of the American Pneumatic Tube Service Company; C. C. Linthicum, of Ofield, Towle & Linthicum; and N. Sampson, of the Sampson Combined Curb and Conduit Company.

Mr. Edmond A. Fordyce, local agent of the American Pneumatic Tube Service, in response to a request from the postmaster, made the following statement:

In 1897 we experimented with a pneumatic-tube system at Cragin, Ill. The line was half a mile in length, and a 10-inch tube was used. The tube was constructed of ordinary water pipe. The carrier was 27 or 28 inches long, 9 inches in diameter, and mounted on wheels, five at each end, so arranged as to allow a rotary motion of the carrier. We were able to dispatch carriers at intervals of five seconds, the shortest interval used. It was found that dispatches from ten to twelve seconds apart could be more easily made and with better results. The dispatches were automatic and there was no shock in delivery, the arrangement of the valves being such as to allow the carriers to roll out smoothly on the receiving table. Experiments on this line were conducted for ten months for nearly ten hours each day. We found the life of a carrier to be from 8,700 to 8,800 miles before a cent for repairs was necessary; the trouble being then only a broken cotter pin, the replacement of which rendered the carrier good for 2,000 miles more. The wheels on the carrier in question were entirely sound.

Postmaster Gordon asked:

Were the tubes underground or above?

Mr. FORDYCE. We found the streets had no sewers, and in order to avoid delay the pipes were laid on the ground. However, we put in offsets and curves of all sorts to demonstrate the practicability of the system.

Postmaster GORDON. What system have you in Boston?

Mr. FORDYCE. Wheel system.

Postmaster GORDON. Is your system in operation anywhere?

Mr. FORDYCE. In Boston we have a line about 2 miles long and we are now building a complete line for commercial purposes. The line in Boston is the same one that was in Cragin. A great many improvements have been made in the system since I have been connected with it.

Captain WEST. Has the system ever been tested for the transmission of mails?

Mr. FORDYCE. No; but at Cragin we used papers, envelopes, etc., and would make them up in packages averaging 50 to 60 pounds for each carrier. The cubic contents of a carrier are about 1,700 inches.

Mr. CAHILL. What was the weight of the carrier?

Mr. FORDYCE. Fifty pounds, and 100 to 120 when loaded.

Mr. CAHILL. Have you ever had any accidents?

Mr. FORDYCE. But one, and that was when we started.

Mr. HUBBARD. Is not a great deal of pressure required for these carriers?

Mr. FORDYCE. No. The wheels tend to reduce a great deal of the pressure required. I have always tried to do away with a slide carrier. I have had ten years' experience and think that wheel carriers are better than sliding carriers.

Asked if the wheels reduced the capacity of the tube he said that they did not to any great extent.

He further explained that by using wheel carriers ordinary water pipes can be utilized, which reduces the expense of the system.

Postmaster GORDON. Are you using the wheel carrier in the 8-inch tube?

Mr. FORDYCE. No; we have never put in an 8-inch tube.

Postmaster GORDON. Your idea is to use the wheels in the 8-inch tube?

Mr. FORDYCE. Yes.

Postmaster GORDON. Would not the wheels add to the weight of the carrier?

Mr. FORDYCE. Some.

Postmaster GORDON. How much?

Mr. FORDYCE. Fifteen to 20 pounds in attaching wheels to a 10-inch or 8-inch sliding carrier. As to how large a tube can be made, I would say there is a limit. I thought when we made the 10-inch tube that we were getting considerable weight, but found we could handle the carriers very easily, and we could probably handle a 12-inch tube just as easily. I would not say what the limit might be.

Mr. HUBBARD. Has there ever been a practical demonstration of the use of large tubes.

Mr. FORDYCE. Yes. Some years ago a man named Johnson made the experiment with spherical carriers in a large tube, but it was a failure. In London there was one about 4 feet square which was also a failure.

Mr. CAHILL. Would it make any difference in cost to the Department for rental whether the wheel or the sliding system were used?

Mr. FORDYCE. I can not answer that.

Captain McGRATH. What space would your terminals take up in a station?

Mr. FORDYCE. That would depend upon conditions. At Cragin the platform we had was about 14 feet square.

Mr. CAHILL. Would the use of the wheels instead of the slide make much difference in a long line? Would the wheel system work as well as the slide system?

Mr. FORDYCE. It would work better, as it takes less power.

Mr. CAHILL. Within what distance is the wheel system practicable?

Mr. FORDYCE. I do not know.

Mr. CAHILL. We have some stations 20 miles away. Could you connect them.

Mr. FORDYCE. I do not know.

Postmaster GORDON. What capacity have your 10-inch tubes?

Mr. FORDYCE. A capacity of 300 carriers an hour, which would carry 18,000 pounds, or 9 tons of matter.

Postmaster GORDON. What is your idea of a system for Chicago, underground or overhead?

Mr. FORDYCE. I should say underground.

Mr. CAHILL. That would probably be necessary for the safety of the mails.

Asked concerning the use of water pipes, Mr. Fordyce said that the rough-coated pipe will last much longer than if the rough coat were cut off.

Captain WEST. I don't see how you get your joints tight enough.

Mr. FORDYCE. We can get them as tight as the joints in gas pipe.

Captain WEST. Does not the air escape?

Mr. FORDYCE. Oh, no. The joints are as tight as gas or water pipes, and they are rigidly examined.

Mr. CAHILL. What is the probability of accident?

Mr. FORDYCE. Not much; but, of course, all pipes will break once in a while.

Mr. CAHILL. How long would it take to repair a break?

Mr. FORDYCE. Not long. We have instruments for locating any obstruction, and then a man gets down and repairs it. We made some experiments along this line at Cragin.

Mr. CAHILL. How long did it take to discover a break and repair it?

Mr. FORDYCE. Of course, the line was short, and we knew pretty well where the break was to occur. To repair this took, as nearly as I can remember, five hours.

Mr. CAHILL. That would be a pretty serious delay. Does the operation of the system require skilled workers?

Mr. FORDYCE. No. At Cragin we had a common laborer at \$1.25 a day.

Postmaster GORDON. What is the difference between your system and the Batcheller system?

Mr. FORDYCE. There are several differences, the wheel bearing being the main one.

Postmaster GORDON. Have you ever given any study to the question of connecting business houses by pneumatic tubes with the post-office?

Mr. FORDYCE. My only experience in this direction was several years ago with Montgomery Ward & Co. I then made a complete set of plans for connecting the building with the post-office, but nothing came of it.

Postmaster GORDON. Supposing we had a pneumatic-tube service in Chicago, could a system of connections be put in by which the business houses could send their mail directly to the post-office, and the post-office in turn deliver mail directly to business houses?

Mr. FORDYCE. I see no reason why not if you had not too many switches. In the Hotel Waldorf I put in a 3-inch-tube system which has 11 stations on one line.

Postmaster GORDON. Can you carry your tubes to the fourth or fifth floor of a building?

Mr. FORDYCE. I do not know how that would be with an 8-inch or 10-inch carrier.

Postmaster GORDON. This is important, as in the new post-office the mailing division will be on the second floor, 30 or 40 feet from the ground.

Mr. FORDYCE. In such an event we should have to use curves.

Captain McGRATH. How many receiving stations could you place on a main tube 3 miles long?

Mr. FORDYCE. I should say the receiving stations on a large tube should be a mile apart.

LETTERS FROM BOSTEDO COMPANY AND MAX FRANK.

The committee received letters from the Bostedo Package and Cash Carrier Company, offering to construct a pneumatic-tube line at its own risk and expense, and a letter from Max Frank, of the Chicago Electrical Institute, in which he claims to have an electric-pneumatic system superior to anything known at present.

Following are copies of letters from L. G. Bostedo, manager Bostedo Package and Cash Carrier Company:

Mr. C. U. GORDON, *Postmaster, City.*

DEAR SIR: I wish to ascertain whether the Post-Office Department would make a provisional contract or arrangement with us for the rental of a system of underground pneumatic tubes for carrying the mail between any two points that you may designate.

We are confident that we have by far the best system for large underground tubes. We have applied for a large number of patents, some of which are already granted, and we wish to demonstrate the superiority of our system. We are willing to build at our own risk and expense a line of tubes, say, for example, from the post-office to the Illinois Central depot, or between any other two points where the service would be of great utility. We will absolutely guarantee this line to do the work it is represented to do, in a manner that is perfectly satisfactory to the Post-Office Department. What we wish to ask you is whether we can get from the Government a provisional contract under which we will receive an annual rental for the service, in case we go ahead at our own risk and put in the line.

We assume that the Government does not wish to be at the mercy of only one company. We have a system far superior to the one that is in use at Philadelphia, and being put in in New York, and stand ready to demonstrate it. We only wish to ascertain whether we can be assured a revenue from this line when it is perfectly satisfactory that will warrant the large expenditure. We would suggest a line 12 inches in diameter, but can put in a line any size you may designate.

Yours, truly,

BOSTEDO PACKAGE AND CASH CARRIER COMPANY,
L. G. BOSTEDO, *Secretary.*

CHICAGO, October 29, 1900.

Mr. C. U. GORDON, *Postmaster, City.*

DEAR SIR: In order to get our proposition more distinctly before you we make the following comparison: It is reported that the Government is paying about \$150,000 per annum for the 6-inch tubes in New York running to the post-office, to the produce exchange, and to be run to the Grand Central depot. While we of course can not say definitely what we can do without knowing the exact requirements of the post-office in Chicago, we can say that it is quite probable that for \$150,000 per annum we could lease to the Government a system connecting all of the six railway depots and stations with the post-office, with tubes large enough to carry the largest mail bags (assuming that the tunnels are available for getting under the river). The velocity would be as great if not greater than that attained by the 8-inch tube system, the deliveries would be completely automatic, and the dispatching of carriers would be controlled by operating a hand lever, with greater ease than the movements of a trolley street car are controlled by a hand lever.

It happens that the distance from the present post-office to the Illinois Central depot is exactly the same as the distance from the new post-office to the same depot. Therefore if a system should be installed from the depot to the present post-office, the cost of removal of the north end of the line to the new post-office would not be great. It may as well be admitted that the art of constructing under-ground pneumatic tubes is in its infancy, and we therefore urge the need of a trial line to be used at the present post-office before the more complete system for the new post-office is built. We submit that such a trial line would give much needed experience, both to the Post-Office Department and to the builder of the line, and would result in a more perfect system for the new post-office than could otherwise be had.

Yours, truly,

BOSTEDO PACKAGE AND CASH CARRIER COMPANY,
L. G. BOSTEDO, *Manager.*

Following is a translation of a German letter from Mr. Max Frank, of the Chicago Electrical Institute:

CHICAGO, September 24, 1900.

Postmaster GORDON, *Chicago:*

The epoch-making discovery of this century in postal matters is an electric pneumatic tube, the Frank system. In promise and in technical construction this system is adapted for surpassing every other, and its cheapness in construction, its velocity and safety make it desirable. Every existing street canal, elevated train, tunnel, sewer, and drainage pipe which is only 6 inches wide can be utilized. Fifty horsepower is enough to propel it. With a velocity of two minutes per mile 100 to 200 letters can be sent out from the central station and they can be sent to a height of twenty stories. Example: Head post-office, North Clark street, West Fifty-second street, South Halsted street, Seventy-fifth street, South State street, Twelfth street—head post-office. In one trip all of these stations can be served and also stations may be passed for which no letters have been dispatched. For these stations a tube is necessary, if constructed according to my system, by which the central stations, 40 additional stations, and 80 substations would need to be supplied with only 6, 2, and 1 person as operators. By means of my electrical mechanical construction 20,000 letters can be dispatched per hour.

As I have not yet patented my invention I am obliged to keep it secret, but I am willing to give diagrams and necessary details upon assurance of a guaranty.

Only by the aid of electricity can a pneumatic tube be quickly and safely operated, and up to this time no system has been invented which is eventually practical. The price of construction of my system is one-third that of others, and in safety of dispatch it throws others in the shade.

UNDERGROUND ELECTRIC-CAR CONNECTION.

The possibility of securing underground electric-car connection between the depots having been suggested to the committee in connection with the tunnel now being constructed by the Illinois Telephone and Telegraph Company, the postmaster and the secretary of the committee spent an evening in inspecting the tunnel. They entered the shaft near Madison street and Fifth avenue and, descending 35 feet, examined the tunnel, which runs from the alley south of Madison

street to La Salle street and north and south on La Salle street between Madison and Monroe streets. The tunnel is shaped like a horseshoe, being 8 feet at the highest point and 5 feet at the widest point.

Mr. A. G. Wheeler, president of the company, was asked on this occasion to attend a meeting of the committee and furnish whatever information he could as to the probability of the tunnel being available for the transportation of mails.

On the evening of October 23 Mr. Wheeler attended a meeting of the committee, and was accompanied by Mr. G. W. Jackson, engineer of the company. There were present, besides the chairman of the committee, Superintendent Cahill, Mr. George L. Lavery, and Mr. W. R. Kerr, of the Batcheller Pneumatic Tube Company.

The following information was elicited:

The POSTMASTER. In the first place, Mr. Wheeler, I understand the name of your company to be—

Mr. WHEELER. The Illinois Telephone and Telegraph Company, incorporated under the laws of Illinois, and possessing franchises from the city council for the construction of tunnels under the principal streets in the business center of the city. You have seen a portion of the tunnel?

The POSTMASTER. Yes; Mr. Cahill and I have been in the tunnel.

Mr. CAHILL. Does the ordinance permit anything besides telephones and telegraphs?

Mr. WHEELER. Yes; mails and newspapers, besides telephone and telegraph business.

Mr. CAHILL. That clears up the matter. Will it admit pneumatic tubes?

Mr. WHEELER. The ordinance says by electricity or otherwise.

The POSTMASTER. About how much of the tunnel is constructed?

Mr. WHEELER. Six shafts. We calculate to finish this district in four months—the tunnels and the laterals. We still have 11 miles of tunnel in the business district and branches under the main river and the north branch.

Mr. CAHILL. What are the prospects of completing the 11 miles?

Mr. WHEELER. About the 1st of July the work will be done.

Mr. CAHILL. The 11 miles?

Mr. WHEELER. Yes, sir.

The POSTMASTER. What will you cover in the business district, and how far south?

Mr. WHEELER. South to Twelfth street, west to Halsted street, and north to Chicago avenue.

Mr. CAHILL. In other words, it will practically connect all the stations and railroad depots in the down-town district.

Mr. WHEELER. Yes, sir.

The POSTMASTER. What is the size of the tunnel?

Mr. WHEELER. Eight feet high, 6 feet wide, horseshoe shape.

The POSTMASTER. And is about the center of the principal streets?

Mr. WHEELER. Is in the center, running north and south and east and west.

The POSTMASTER. You contemplate going under what streets in order to cross the river?

Mr. WHEELER. I would not care to say; but we will also go under the south branch and the main river.

The POSTMASTER. How many feet is the tunnel below the surface?

Mr. WHEELER. Thirty-five feet under the streets and about 60 feet below the river.

Mr. CAHILL. That is a pretty steep grade, is it not?

Mr. WHEELER. No; we begin at Market street and come out at Clinton street.

Mr. CAHILL. Have you any plan in mind for handling the mail in bulk—that is, in pouches?

Mr. WHEELER. We have avoided mentioning much about this, as we have thought best to first get our tunnel ready for business and then come in and bid for work. We thought we would handle the mail as now handled—in pouches. We expect to be ready for business about June or July, 1901.

Mr. CAHILL. Will any portion of the tunnel be available before July 1?

Mr. WHEELER. For messenger service about the 1st of May, I think.

The POSTMASTER. Could you bid on this service?

Mr. WHEELER. We have taken a long time—as we think four months a long time—and have said July; but you understand, of course, that there is a lot of work in the tunnel after the tunnel itself is finished.

The POSTMASTER. How would you connect with depots?

Mr. WHEELER. What do you mean?

The POSTMASTER. How would you get the mail up from the tunnels?

Mr. WHEELER. It would come up through the laterals; that is the method of distribution from the tunnel. If we had tubes it would come up in the tubes; if we had cars it would come up in elevators. We have detailed plans, but are not in a position to submit them now.

Mr. CAHILL. Might you not make good time in the car and then lose it in getting the car up and down?

Mr. WHEELER. We are now running cars in our tunnels and handling 400 or 500 in 8 hours. We handle all our dirt between 8 at night and 5 in the morning, which is all handled in these cars.

I would like to say, Mr. Gordon, that a talk at this time is not what would be desired, as it is not our time to do the talking. We are preparing to come in as bidder. We are not looking for a subsidy but to do the work. We expect to meet any requirements or not get the work. We will do it in schedule time, anyway.

The POSTMASTER. Now, Mr. Wheeler, you have had more or less experience in matters of this kind, what is your opinion of the size of pneumatic tube really practicable or available for transporting mail?

Mr. WHEELER. I do not think that is a fair question to ask me, as it is largely a matter of opinion. My own opinion is that a 36-inch tube is practicable and feasible and can be operated successfully. But there may be better methods of doing this work than by tubes.

The POSTMASTER. I suppose the largest tube now in operation is the 8-inch, or is there one larger?

Mr. WHEELER. The 12-inch is the largest in this country. I think there are larger on the other side, but I would not state for a positive fact. There is here in operation a 30-inch tube on private work about $1\frac{3}{4}$ miles long, in Burlington, N. J.

The POSTMASTER. What kind of pipe is that?

Mr. WHEELER. Cast-iron pipe.

The POSTMASTER. What is the size of the tube?

Mr. WHEELER. I should say 30 inches in diameter.

The POSTMASTER. You say it is about $1\frac{3}{4}$ miles long?

Mr. WHEELER. I understand it is between a mile and a half and three-quarters.

Mr. KERR. This 30-inch tube you speak of has been in for several years, has it not?

Mr. WHEELER. Over four years.

Mr. KERR. It is not a practical line?

Mr. WHEELER. No.

Mr. KERR. Merely experimental?

Mr. WHEELER. Yes.

The POSTMASTER. Mr. Wheeler, have you given any thought to the way in which mails could be handled?

Mr. WHEELER. Yes; we have detailed plans, but I would not care to submit them. We have nothing experimental. As a corporation we think it best to complete our tunnels and come in and bid. If we can get the work we will.

Mr. CAHILL. This system might solve the interdepot question, leaving the matter of interstation exchange an open one.

LOCAL COMMITTEE IN THE EAST.

The honorable Second Assistant Postmaster-General having advised the local committee of a meeting between the local committee and the departmental committee, to be held in Boston, etc., by permission of the Department, the postmaster being unable to attend in person, Maurice J. McGrath, superintendent of the city delivery division, was sent as the representative of the postmaster of Chicago. His report follows:

OCTOBER 8, 1900.

Hon. CHARLES U. GORDON,
Postmaster, Chicago, Ill.

SIR: By your direction to act on the committee to investigate the pneumatic-tube system under authority of the honorable Second Assistant Postmaster-General, I beg to report that, in company with Capt. E. L. West, your associate member of the local committee, I left Chicago September 22, at 2 p. m., via the Lake Shore and Michigan Southern Railway. We arrived at Boston at 4.30 p. m. September 23.

On Monday, the 24th of September, the committee met informally in the office of the postmaster of Boston, and, upon stating the object of their mission, the postmaster was elected chairman of the meeting, and after some little discussion of the subject of the investigation the committee adjourned to meet at the same place at 2 o'clock in the afternoon.

The committee proceeded, in charge of the postmaster, to witness the operation of the pneumatic-tube system in the post-office. After observing the manipulation of the carriers the committee visited the basement, where we saw the machinery and power, and listened to the explanations of the engineer in charge and the postmaster. We were then taken from the post-office to North Union station, the other end of the tube line. This is distant about seven-eighths of a mile.

The room in which the tube is located at the depot is about 30 by 40 feet, the post-office having ten men employed during the twenty-four hours, and the local company keeping one man on duty to look after the machinery. In this room are located bag racks to accommodate all pouches necessary to be made up for outgoing trains. The mails received through the tube for trains leaving this depot are pouched for dispatch by these clerks.

I learned that they dispatched nearly 400 pouches daily from this point, and that a corresponding number is received from trains arriving at the depot, the contents of which is all dispatched to the post-office through the tube by this force of clerks.

I was unable to learn whether any actual saving in time was effected by this system over that of the wagon system, as the mail received through the tube at this station is pouched and locked ten minutes before the departure of trains. These pouches had then to be trucked to the trains, quite a distance from the room in which the tubes terminate. Supplementary mails from the post-office for the outgoing trains, after the regular close, were taken by the clerks to the trains just before leaving time.

This system, as I noticed it, was in an experimental stage, and can, no doubt, be greatly improved upon in the way of handling and transmitting the mails in both directions, and I understand that many improvements have been made in that direction since the inauguration of this service.

When the system is extended from the Boston post-office to the stations its utility may be greatly enhanced by the railway post-office clerks making up direct packages for stations. These packages may then be transmitted in special carriers to the various stations without rehandling. These details, of course, are matters which necessarily must be worked out after the installation of the extended system.

As agreed upon, the committee met promptly at 2 p. m. in the office of the postmaster, and listened to an address made by Mr. Dilloway, president of the American pneumatic-tube system, which company is now constructing a pneumatic tube in the streets of Boston for commercial purposes. I understand that they are competitors of the Batcheller system, and that they are desirous of introducing their system for postal uses in cities.

Upon the invitation of Mr. Dilloway to visit Lowell, Mass., where their factory is located, the committee voted to make an excursion to that point the following day. I would say in this connection that Mr. Batcheller, of the Batcheller system, was present at both meetings of the committee and participated in the discussion. Both Mr. Dilloway and Mr. Batcheller endeavored to convince the members of the committee that their respective systems were the best.

The committee visited Lowell the next day and were met at the depot by Dilloway and other officials of his company. We were taken to the factory, where we were shown through and were given an opportunity of seeing their experimental system in operation. The tube in the American system is 10 inches in diameter, is constructed of common water pipe, and the carriers, unlike those of the Batcheller system, have five wheels at either end and weigh nearly 50 pounds each. The openings of these receptacles are on the sides, while in the 8-inch system the carriers open at the ends.

A practical exhibition of the workings of the system was given, sending quite a number of carriers through a tube. The table upon which the dispatching and receiving tubes rest is made of iron; opposite the receiving tube is a large bumper or buffer, made of metal, against which the carriers strike with considerable force upon leaving the tube; indeed, with so much force as to be seemingly dangerous to those handling the carriers.

In the operation of the other system, using the 8-inch tube, the velocity of the carriers is greatly reduced at the receiving point, and their arrival is without shock. From careful observation of the two tubes—8-inch and 10-inch—I am convinced of the fact that the 8-inch tube is not only easier in operation, but that its diameter is ample for postal purposes. There is little difference in the capacity of the carriers; the variance of 2 inches in their inside diameter is not sufficient to be considered of any material advantage. The point is made for the 10-inch tube that it is cheaper

of construction, by reason of its being made of common water pipe, jointed in the usual manner, while the tubes in the 8-inch line are required to be reamed out smoothly at much greater expense. In the 8-inch tube the carriers fit the tube snugly, and there is naturally more or less friction, while in the 10-inch line the carrier is fitted with wheels at the ends, which, it is claimed, reduce the friction to the minimum. So far as I can learn, there has been no serious difficulty or stoppage in the operation of the 8-inch tube, and its advantages seem manifest over the larger tube by reason of the great difference in the weight of the carriers, those of the 8-inch tube weighing 13 pounds each while those of the 10-inch line weigh nearly 50 pounds each. It is unnecessary to dwell upon the relative ease of handling.

The committee returned from Lowell to Boston in time to take the 3 p. m. train for New York on Tuesday, reaching the latter point at 9 p. m., with the understanding that the committee would meet in the office of the postmaster of New York at 10 a. m. Wednesday, and the postmaster was so notified.

Meeting promptly at the hour and place named, the committee proceeded at once into an investigation of the tube system in the New York post-office in charge of the assistant postmaster, Mr. Morgan. After witnessing the operation of the tube service, and being shown the machinery and power in the basement, we were taken in charge by Mr. Masten, superintendent of mails in the Brooklyn office, to Brooklyn, where we had another illustration of the tube service. It was explained that under the old system it required one and one-half hours for the transmission of mails between the Brooklyn office and the Grand Central depot in New York, while by the tube system but 55 minutes is necessary, a saving of 35 minutes between the two points.

I expected to be supplied with data showing what per cent of the whole mail sent from Brooklyn to the Grand Central depot is sent through the tube. This information has not reached me. We were told at Brooklyn that in an experiment recently made they had reduced the time in transmission of mail between the post-office and trains leaving the Grand Central depot in New York to 11 minutes, but that this rate of speed could not be maintained at the present time in the handling and dispatch of mail between the points named. They expect to reduce the time of the present schedule greatly in the near future.

The committee returned from Brooklyn to New York, visiting Station H, the terminal of the New York line, and also visiting the intermediate stations along the line. We witnessed the operation of the service at each of these points, and from all the data that could be gathered from employees, as well as by comparison of schedules, we were convinced of much saving in time in the transmission of mails along this line over the former system. The length of the lines operated in New York demonstrates very clearly the utility of the system.

I might add that at the Brooklyn office they are now using papier-maché carriers, which fit into the metal carriers, and which are now used to transmit mail from railway post-office lines entering the Grand Central depot in New York. In these papier-maché carriers the railway post-office clerks make up mails for the stations of the Brooklyn office, which are sent unbroken to the main office in Brooklyn from Station H in New York, saving considerable time by this means. From the operation of this supplement to the tube system I am satisfied that the idea can be carried out to a greater extent, resulting in the saving of much time through the elimination of rehandling the mail at various points along the line.

Returning to the New York post-office in the afternoon, the committee agreed to meet in Philadelphia at the office of the postmaster at 2 p. m. the following day. The committee met at the hour and place named, there being present some of the officials of the local pneumatic-tube company. After some little discussion by the postmaster and the officials of the company, the committee was taken through the post-office, where we witnessed the operation of the 8-inch and 6-inch tubes. The latter line has been in operation since 1893, the tube extending from the post-office to the Bourse Building, a distance of .52 mile. After witnessing the operation of the service in the post-office we were taken to the Pennsylvania Central depot, the other end of the 8-inch tube line. In this room they have 15 employees handling the mail. The space in which the service is performed is inadequate, and the work can not, in my opinion, be done advantageously. We were informed that about 96 per cent of all the mail received and dispatched between the post-office and the Pennsylvania depot is transmitted through the tube, the residue being conveyed by wagon. I was not convinced from what I saw that any time was saved in the handling of mails received or dispatched from this point; while, on the other hand, the officials of the Philadelphia post-office claimed to have figures showing a considerable saving. In fairness to the service, however, I would say that we did not have the time either at that point or at the other cities which we visited to study out the actual time required by the tube and the former systems, to determine by such investigation the actual time saved.

We were taken to the Bourse Building, the other end of the 6-inch tube line, and saw the service in operation at that point. We practically spent the afternoon in this investigation.

The committee decided to proceed to Washington, D. C., the next day. We reached Washington Friday evening. On Saturday, September 29, I called upon the honorable Second Assistant Postmaster-General and made a brief verbal report of my observations of the pneumatic-tube system at the various cities. He apparently was interested in what I had to say and expressed a wish that a copy of my report to you be forwarded to him.

I was present at a meeting of the general committee, which took place Saturday in the office of the honorable Second Assistant Postmaster-General, when the itinerary of the general committee was discussed, and it was understood that this committee would visit Chicago between the 15th and 18th of October.

In the foregoing I have outlined the itinerary of my service with the committee, and have instituted no comparisons between the tube system and the former systems (wagon or street car) which would definitely exhibit their relative values in expediting the dispatch or delivery of the mails. This dearth of figures and data, it must be explained, is entirely due to the brief stay in the different cities visited and the limited opportunities afforded for collating such tangible evidence. The general committee, which will soon convene in this city, are expected to make an exhaustive statement of these figures, to which due reference may be made.

This is a progressive age. Take the efforts exerted to secure the fastest trains for the transmission of mail between the large cities. To adopt a method which insures the rapid transmission of mail between the post-office and the railway depots, and between the post-office and the stations is surely in line with the other steps to accelerate the mails.

In Chicago we have a field of our own for this system. Six passenger depots widely separated and each one distant one-half mile or more from the post-office, and the many large stations, from 1 to 6 miles from the main office, serving the immensely valuable and important business interests, present an irresistible argument for the installation of a pneumatic-tube system which would demonstrate more positively than in any other city in this country the actual value of rapid interurban transmission of the mails.

It is not within the scope of my report to set forth the lines which, in my opinion, would be practicable in Chicago. But when I contemplate the possibilities of the pneumatic-tube system in this great city, I see before me the greatest postal-delivery apparatus in this country or, for that matter, in any other country.

The introduction of pneumatic tubes would naturally be followed by a very large increase in the local postal revenues, due to the public using the mails in preference to the local telegraph and American district telegraph systems. Reasoning along the same lines, the increase in receipts on account of the augmented special-delivery fees would be large.

In dispatching mail to stations or to depots by tube, a time must be set, as at present, for every close; this close of dispatch may be thirty minutes or one hour before the leaving time of the train or of the carriers. Is it not quite possible that the public, particularly the business public, would be more than willing to pay a special fee, say of 5 cents, for the assurance of immediate dispatch? Let it be understood that this does not comprehend the payment of additional postage, but merely that a special fee for immediate dispatch be imposed for this privilege.

We now have a special-delivery fee for the privilege of immediate delivery of the letter or other article of mail matter upon its arrival at its destination. It does not insure the acceleration of the letter other than to obtain its delivery immediately upon arrival at the post-office or station serving the place of address. While in the process of transmission, and following its deposit in the mails, it is subject to the same treatment as ordinary mail matter.

The time set for the close must of necessity be adhered to. It is not practicable to continue the dispatch of mail intermittently up to the last moment before the departure of the train or of carriers. Upon the arrival of the mail at the station of dispatch or of carriers' delivery, it is made up and sent to the train, or is taken from the case by carriers. Matter deposited in the post-office or station along the line of the pneumatic tube, with the "immediate dispatch" fee prepaid, could be sent through the tube up to the very last moment before departure. On its receipt, clerks could hurry it to the train or to the carriers.

While this proposition is radically without the scope of the service as it exists at present, it is, in my opinion, quite feasible when considered in connection with pneumatic tubes.

In the presentation of this idea, I am forced to speak only in generalities, and can give no specific instance of its value. Only upon the establishment of the pneumatic-tube system could its worth be proven.

That the public would appreciate the innovation is beyond doubt. The ever-growing popularity of the special-delivery system is sufficient to warrant me in entertaining this belief.

In closing, permit me to express my sincere appreciation of the honor conferred upon me by your selection to act in your stead on the committee and to hope that my observations may not be in vain.

For the information of the local committee, Capt. E. L. West, superintendent, sixth division, Railway Mail Service, prepared a report of the quantity of mails dispatched from depots to the general post-office, Chicago, Ill., and the number of through pouches exchanged between the railroad stations. Following is a copy of Superintendent West's report:

CHICAGO, ILL., October 29, 1900.

CHARLES U. GORDON,

Chairman Committee on Pneumatic Tube Service, Chicago, Ill.

SIR: Referring to the report of the committee on pneumatic-tube service for the city of Chicago which is to be made for the consideration of the departmental committee, which will meet here for that purpose about November 1, I have to state that on October 4 I had the pouches containing letter mail counted and weighed for twenty-four hours, which are exchanged between the general post-office and the various depots throughout the city and between the various railroad depots. For the information of the committee I would report the result as follows:

POUCHES DISPATCHED FROM DEPOTS TO GENERAL POST-OFFICE.

	Number of pouches.	Weight.
		<i>Pounds.</i>
From the—		
Union depot	149	5,224
Dearborn depot	122	2,507
Northwestern depot	150	4,352
Illinois Central depot	111	3,203
Lake Shore depot	100	3,275
Grand Central depot	21	444
Total	653	19,005

POUCHES EXCHANGED BETWEEN RAILROAD DEPOTS.

		<i>Pounds.</i>
From Union depot to—		
Lake Shore depot	101	3,195
Dearborn depot	76	1,186
Illinois Central depot	85	1,602
Northwestern depot	73	1,658
Grand Central depot	12	305
From Lake Shore depot to—		
Union depot	123	4,494
Dearborn depot	16	236
Illinois Central depot	40	1,600
Northwestern depot	20	389
Grand Central depot	2	44
From Dearborn depot to—		
Union depot	80	1,442
Lake Shore depot	20	232
Illinois Central depot	44	481
Northwestern depot	41	615
Grand Central depot	3	25
From Illinois Central depot to—		
Union depot	88	1,828
Lake Shore depot	27	407
Northwestern depot	45	1,586
Dearborn depot	45	539
Grand Central depot	4	44
From Northwestern depot to—		
Union depot	77	1,440
Lake Shore depot	42	1,209
Illinois Central depot	46	814
Dearborn depot	43	631
Grand Central depot	11	439
From Grand Central depot to—		
Union depot	14	197
Lake Shore depot	3	38
Illinois Central depot	10	122
Northwestern depot	7	83
Dearborn depot	9	92
Total	1,207	26,973

During the visit of the committee in various Eastern cities to inspect the pneumatic-tube service and obtain information concerning the workings and the practical benefits to be derived from the use of the tubes, I made a careful investigation of this service, particularly so far as it involved the transmission of mails from general post-offices to depots, and must say that I was not particularly impressed with its utility, so far as this branch of the service was concerned.

It seems to me that the question of transmitting the mails by pneumatic tubes from the general post-offices to the various depots resolves itself down to this: How much benefit can be derived by expediting the first-class mails during the rush hours of the day, and if we figure on a thirty-minute close being bettered and the mails being expedited during that time to any appreciable extent, it is all that we can expect. For instance, take the present location in our general post-office and the Illinois Central depot.

In my opinion, this is the only one where the distance is so great that the service by pneumatic tube would be commensurate with the increased cost involved, and even in that case, we could not decrease the messenger service by one wagon. We must figure, not only for the present needs of the service, but for the future, and when the general post-office is located in the new building the principal depots will be but a short distance from that office and the great bulk of the mails can be dispatched quicker and to better advantage by messenger's wagons than they could if dispatched through the tube. Of course, I do not mean that certain letters, particularly special deliveries, and important mails for which business firms, corporations, and banks would be willing to pay something additional for the quicker service that they would get, would not receive some benefits from the new service, but the great bulk of the business mails can be handled from the post-office to the depots in my opinion as well and as quickly by messenger's wagons as they could if dispatched by tube and pouched from the depots to the trains after the matter has been received there.

So far as the service from the general post-office to the stations of the Chicago office is concerned, that is another matter, and I am inclined to think that pneumatic tubes would be of appreciable benefit to the postal service and to the public at large. If it is decided to recommend that tube service be established, say from the general post-office as far north as Lakeview by way of the Northwestern depot, and to the west by way of the Union depot, and Station U to Stations C and D, and south by way of the Illinois Central depot to the Stock Yards, I believe that good results can be obtained and that the mails in general for these districts can be handled quicker and to better advantage, and I would not object to the tubes being connected with the three depots mentioned.

However, as I said before, I do not think that any appreciable benefits can be derived by the tube service from the general post-office to the various depots. I am of the opinion that if the officials of the post-offices where this service is in operation were consulted, they would tell you that the greatest benefit was obtained by the tube service from the general post-office to stations excepting, possibly, one line in New York, which runs from the general post-office to Station H, and from Brooklyn to Station H, the latter being the great distributing point for mails for dispatch by the New York Central Railroad.

I simply offer these suggestions so that they can be considered by you and the entire matter discussed by us when we meet to take up and consider our report, which must be made to the general committee, as I understand it, by the first of next month. At that meeting we can consider these matters and make what changes and alterations are deemed proper in the report and eliminate any suggestions which do not meet with the approval of both of us.

JOINT MEETING OF LOCAL AND DEPARTMENTAL COMMITTEES.

On October 9 the committee appointed by the Department, consisting of J. M. Masten, chairman; E. W. Alexander, and John A. Montgomery, arrived in Chicago, and on the evening of the same day held a conference with the local committee in the office of the postmaster. There were present, in addition to the members of the committees, Assistant Postmaster John M. Hubbard; Supt. Daniel P. Cahill, secretary; Assistant Supt. L. T. Steward; L. J. Barr, topographer; Edmond A. Fordyce, of the American Pneumatic Tube Service Company, and Mr. Stuart, representing the Batcheller Pneumatic Tube Company.

Chairman Gordon, of the local committee, reviewed the work already done by the local committee, and then invited attention to a report made by him as postmaster to the Department, February 26, 1898, in reference to pneumatic tubes, and to a second report on the same subject, made March 3, 1900. The second report contained a plan for pneumatic-tube service on the south side of the city. After discussing the subject fully and after a general exchange of views it was agreed, considering all phases of the question, that the system immediately available for the rapid transmission of local mails was the pneumatic-tube system in some form or other. It was likewise the consensus of opinion that such a system ought to be established and installed in connection with the Chicago post-office, some of its principal stations, and certain railway depots, where postal stations are now situated or hereafter are to be established.

As to the territory in which the tubes should be laid, the joint committees at this time were not in a position to definitely determine. Chairman Masten stated that the departmental committee was going west and would return about November 1. Chairman Gordon then announced that the local committee in the meantime would further consider the matter and later advise what stations and depots, in the opinion of the local committee, should be initially connected by pneumatic tubes.

SECOND AND THIRD MEETINGS OF THE TWO COMMITTEES—PLANS DISCUSSED.

The two committees met in joint session for the second time November 1 and 2. Several propositions to connect railway depots and postal stations were submitted by the local committee and the question thoroughly examined from all sides. The questions marked 2, 3, and 4 in the Postmaster-General's instructions and 8 and 9 in the instructions of the honorable Second Assistant Postmaster-General were specifically gone into.

Following are the questions:

2. Having special reference to the volume of mail passing between the points where the installation of the service may be recommended.
3. The size of the tube deemed necessary for present and prospective demands of the postal service.
4. The space that may be available at terminal points and intermediate stations for the installation of the plant.
8. Second, the volume of mail matter passing between said points, first-class mail especially.
9. Third, the advantages to be derived to the postal service from the underground carriage of such mail in reducing the time of trips, affording greater security, and avoiding the delays by reason of congested surface travel, etc.

In the interim between the first and second visits of the departmental committee, data and maps were prepared showing the local service in its principal phases. Due attention was also paid to the topography of the city, centers of population, and the physical difficulties of transportation.

The large map forwarded to the Department with this report, which may be termed Exhibit A, shows the city of Chicago and its postal stations.

DISTANCES.

The shape of the city, as it appears on the map, shows the difficulty of establishing any one general system of transportation. The city has an area of 190 square miles. The business center is $16\frac{1}{2}$ miles from the southern boundary, $9\frac{1}{2}$ from the northern, and $7\frac{3}{8}$ miles from the western. A line drawn from Howard avenue, which is the northern boundary of Rogers Park station, to One hundred and thirty-eighth street, on the south, which is the southern boundary of Riverdale Station, shows a length of 26 miles. A line drawn from Norwood Park Station, which is in the extreme northwest of the city, to Hegewisch Station, which is in the extreme southeast, gives a distance of $28\frac{3}{8}$ miles. A line drawn from the northwestern boundary of Winnemac Station to the southern boundary of Clarkdale Station gives a distance of 18 miles. A line drawn from the northern boundary of Norwood Park Station to the southern boundary of Austin Station, on the west, gives a distance of 9 miles, while a line drawn from the northern boundary of Dunning Station to the southern boundary of Montclare Station gives a distance of 3 miles, which is the shortest north and south line in the city. At its widest point, in the neighborhood of Eighty-third street, on the south, the city is $10\frac{1}{2}$ miles wide. Farther south, near One hundred and eleventh street, it is $8\frac{1}{2}$ miles wide. At Twelfth street, near the center, it is 6 miles wide, while at Bryn Mawr avenue, on the north, it is $6\frac{3}{8}$ miles.

DIMENSIONS, POPULATION, AND BUSINESS.

The city is trisected by the river, which enters Chicago slightly north of the business center and, proceeding for about a mile, divides into two branches, one meandering to the northwest, where it ends in a rivulet in Winnemac Station district, and the other meandering to the southwest, where it joins the Drainage Canal and the Illinois and Michigan Canal. The banks of the river and its branches are thickly studded with factories, warehouses, lumber yards, and elevators, all of which transact a large business and all of which have to be considered in providing mail facilities.

The following statistics, taken from the Chicago Times-Herald of November 12, show the magnitude of the industries situated along the river and its branches:

Number of manufactories on Chicago River.....	9, 321
Annual value of products.....	\$94, 125, 000
Average values of products per annum per factory.....	\$10, 107
Number of employees.....	186, 275
Average number of employees to each concern.....	21
Area lumber and elevator sites, acres.....	965
Railroad trackage on river banks, miles.....	965
Lumber received on river, 1900, feet.....	378, 546, 000
Vessels entered port, 1900.....	5, 761
Vessels entered port, September only.....	1, 028
Annual value, river commerce, estimated.....	\$550, 000, 000

The divisions of the city, formed by the river and its branches, are respectively known as the South Side, the West Side, and the North Side.

The business center of the city, where the principal mails are received, delivered, and dispatched, is in the extreme northeast corner of the South Side.

The recent Government census shows Chicago to have a population of 1,698,575. Approximately, 764,342 people live on the West Side in

16 wards, covering an area of 60.73 square miles, which is served by 17 postal stations. The principal railroad depot in the city is the Union depot, situated on the west bank of the river, in the West Side, and mails from this depot have to be carried across the city a distance of 1.282 miles, over a bridge and through the congested business streets to the temporary post-office, which is situated on the shore of Lake Michigan at the extreme east side of the city.

The population of the South Side is, approximately, 641,861. Its area is 107.85 square miles. It has 12 wards and is served by 24 postal stations. It includes, as already noted, the business center, where the major portion of the mail originates, is delivered, and is dispatched. It also contains the following railroad depots: Dearborn, Illinois Central, Grand Central, and Rock Island and Lake Shore depots.

The population of the North Side is 292,372. It has 7 wards and is served by 6 postal stations, and has an area of 21.65 square miles. It contains the Northwestern Railway depot (second in postal importance to the Union depot) situated on the north bank of the main river at Wells and Kinzie streets. Similar conditions apply here in respect to the difficulty and delay in the transportation of mail to the post-office as apply in the case of the Union depot.

I inclose, marked "Exhibit B," a section of the city map, which shows the railroad depot district and the principal business and postal centers. State and Madison streets is the center of the business district; a radius of 1 mile from this point takes in practically everything of great business importance from Halsted street to Lake Michigan, and from Twelfth street to Chicago avenue. The map shows the railroad depots marked in black, and the postal stations, both present and proposed, marked in red.

EXPEDIENCY OF VARIOUS PLANS.

The question first considered by the local committee was: "Is it advisable to begin by recommending a rapid system of transportation in any one side of the city to the temporary exclusion of the others?" The South Side, having the largest area, most of the railway depots, and the principal business center, it was thought might be given rapid transportation first. As, however, this would not facilitate the interchange of mails between the three sides of the city, this plan was partly abandoned, and it was decided that it would be best, while treating the South Side more extensively than the other two sides, to recommend that rapid transportation facilities be applied to the three sides of the city, so that the whole local service might be the gainer. Some of the suggestions considered by the committee proposed the establishment of pneumatic-tube service connecting the general post-office with the principal railroad depots, Stations U, C, and D on the west; Lincoln Park on the north, and F on the northwest; Pilsen on the southwest, and Stock Yards on the south. Another of the suggestions was the plan discussed in the report of the postmaster dated March 3, 1900, which suggested a pneumatic-tube service between the general post-office, Illinois Central Railway depot, Twenty-second Street station, station at Thirty-first street and Indiana avenue, Station M, Hyde Park station, proposed station at Woodlawn, Englewood station, and the Stock Yards station.

The plan which finally met with favor was a modification and combination of all the plans suggested. It provides for the establishment

of pneumatic-tube service on the South Side as far as Forty-second and Halsted streets, on the North Side as far as Northwestern depot, and on the West Side as far as Union depot.

MAIL HANDLED AT THE DEPOTS.

Data on this page have a bearing on this question, as they show the number of pouches received at the principal depots in one day, intended for the Central station.

These figures are taken from the report of Captain West. In October 1, 1899, this office weighed the mails for thirty-five days. The figures then taken show the amount of mail of all classes dispatched by railroad. I have taken these figures and have divided them by thirty days (excluding Sundays), and this gives the amount of mail dispatched in one day in October, 1899, so that we have the result as the complement of Captain West's figures, and it gives an approximate idea of the quantity of first-class mail dispatched to the several downtown depots by the Central and other stations.

Following is the table (weights proportioned to depots):

	Incoming.	Outgoing.
	<i>Pounds.</i>	<i>Pounds.</i>
Union depot	5,224	13,654
Dearborn depot.....	2,507	6,552
Northwestern depot.....	4,352	11,374
Illinois Central depot.....	3,203	8,371
Rock Island depot.....	3,275	8,660
Grand Central depot.....	444	1,160
Total.....	19,005	49,671

STATION DATA.

Statistics were taken at 15 of the principal stations to determine the relative value of the stations in respect to connecting them by pneumatic tubes. The following table shows the statistics for the 15 stations mentioned. The stations hereinafter recommended as stations to be given pneumatic-tube service are indicated by stars.

Mail statistics of the principal stations for one day.

Stations.	Distance from general post-office.	Number of pieces received for delivery.		Number of pieces dispatched—distribution, local, and direct.		Number of pieces could be dispatched by pneumatic tubes.		Number of specials received for—	
		First class.	Other classes.	First class.	Other classes.	First class.	Other classes.	Delivery.	Dispatch.
U*.....	1.05	255,182	39,342	42,519	86,846	42,519	86,846	123	35
Board of Trade*.....	.72	27,833	6,167	212,500	81,667	333,333	100,000	21	17
Monadnock.....	.64	6,681	628	20,889	41,772	41,777	83,544	.....	22
Southwater*.....	.63	.....	.....	12,629	18,354	25,258	36,707	.....	7
C.....	1.78	17,547	4,021	9,626	11,405	28,877	13,072	.....	6
D.....	2.91	19,339	12,488	10,178	4,732	20,356	5,898	.....	30
F.....	1.95	15,836	6,929	5,744	1,163	18,333	3,333	.....	9
Lincoln Park.....	2.06	27,762	12,102	3,592	1,118	50,000	8,940	.....	10
Pilsen.....	3.13	53,610	12,267	3,504	7,433	7,500	8,333	.....	3
Twenty-second street*.....	2.16	16,895	4,097	3,104	945	13,333	1,833	.....	18
Stock Yards*.....	5.69	22,463	26,015	14,263	21,016	20,833	25,000	.....	8
Armour*.....	4.41	20,044	7,219	2,702	1,703	10,000	5,000	.....	4
Englewood.....	7.88	16,778	9,306	5,817	1,333	9,167	1,667	.....	7
M.....	4.52	27,443	13,348	9,565	2,341	19,000	11,667	.....	17
Central*.....	.....	362,036	43,968	(a)	(a)	(a)	(a)	(a)	(a)

a The depot tables cover these items for central station.

RECOMMENDATION IN FAVOR OF PNEUMATIC-TUBE SERVICE FOR CERTAIN STATIONS.

The joint committee, after a very careful and thorough examination of data and maps submitted, determined to recommend the establishment of pneumatic-tube service for the following postal stations and railway depots:

First. A double line of 8-inch tubes from the general post-office, west by south to Board of Trade station, 117-119 Quincy street; thence west to Station U, in the Union depot. Distance one way, 1.282 miles.

Second. A double line of 8-inch tubes from the general post-office, west by north to Southwater station, 15 La Salle street; thence to Northwestern depot. Distance one way, 0.906 mile.

Third. A double line of 8-inch tubes from the general post-office south to the Illinois Central depot; thence south to Twenty-second street station, corner Indiana avenue and Twenty-second street; thence south to Armour station, corner Thirty-first street and Indiana avenue; thence west to station to be established at Thirty-first and Halsted streets; thence south to Stock Yards station, Forty-second and Halsted streets. Distance one way, 5.77 miles.

Total distance, 7.958 miles.

The establishment of these three lines would necessitate, in connection with the second line:

(a) The establishment of a postal station in the Northwestern depot.

(b) In connection with the third line it would necessitate the establishment of a postal station in the Illinois Central depot; the removal of Armour station from its present location, 3217 State street, to the corner of Indiana avenue and Thirty-first street, and the establishment of a new station at Thirty-first and Halsted streets. Map marked Exhibit C shows these lines.

VOLUME OF DEPOT MAIL.

The advantages of connecting the depots mentioned by pneumatic tubes can best be shown by the following statement, showing the average volume of letter mail received and dispatched in one day through the Union, Northwestern, and Illinois Central depots. Weights include equipment:

	Incoming.	Outgoing.
	<i>Pounds.</i>	<i>Pounds.</i>
Union depot	5, 222	13, 654
Northwestern depot	4, 352	11, 374
Illinois Central depot	3, 203	8, 371

The next statement gives the number of daily incoming and outgoing mail trains in the three depots to be connected with the general post-office and stations by tubes:

	Railway post-offices.		Express trains.	
	In.	Out.	In.	Out.
Union depot	19	22	30	38
Northwestern depot	18	17	42	27
Illinois Central depot	16	16	11	9

It is important to note that 67 per cent of all the incoming and outgoing mail is handled at these three depots.

THROUGH MAIL, MAIL FROM DEPOTS, AND INTERSTATION EXCHANGES.

In discussing the use of pneumatic tubes, the committee took into consideration these questions:

1. Can tubes be utilized to transfer through mails, that is, mail which is merely passing through Chicago from the East to the West, and from the North to the South, etc., and which is not handled by the Chicago post-office, or any of its stations, but is merely conveyed through the city by wagon from one railway depot to another?

2. Can tubes be utilized to transmit all mails, or the major portion of all mails, from railway depots to postal stations, or from postal stations to railway depots at any greater rate of speed than is now made by the wagons of the mail messenger?

3. Can tubes be utilized with advantage to interchange mail between the stations of the Chicago post-office?

On the first question the committee was unanimous that the tube system, with its present capabilities, can not be used at all to transmit through or transient mail from railway depot to railway depot. The reason why transfer mail can not be handled by tubes is that such mail must be kept in pouches and sacks and there is no known tube in operation anywhere which can convey pouches and sacks. When a tube system is invented, or an underground electric railway system completed which will carry pouches and sacks intact, the question of quicker transmission of through or transfer mail will be a practical one, but not until then. The foregoing refers particularly to the transmission of through mail in bulk in pouches and sacks.

Direct transfers of small quantities of incoming mail, of course, could be made through the tube, in which event certain wagon trips could be dispensed with.

On the second question, it seemed clear that 8-inch tubes are not large enough to carry all kinds of mail, but it is believed that they can carry the major portion. The utility of the tubes for late closes of first-class mail to be dispatched to railway depots is demonstrable. There is some question as to the rapidity with which the tubes can convey mail from a depot to the general post-office to be connected on carrier's trips when it is taken into consideration that incoming mail would have to be carried some distance to the tube terminal, there unpouched and tubed to the general office or station. Were the terminals close to the incoming points where mail is received, the most rapid connections could be made and such connections, it is conceived, would be far superior to any that are now made by surface transportation. To unpouch incoming mail would be no disadvantage as this has to be done in any event.

There are elements of apparent disadvantage in generally sending mail to railway depots through tubes from the post-office and stations, the chief being the necessity of establishing pouching sets in railway depots. It is conceded, however, that postal stations in the large railway depots of great cities conduce to the improvement of the service, and if the use of tubes would help to bring about the establishment of such stations, the problem touched on can be solved readily.

The connecting of postal stations by tubes meets the unqualified and hearty approval of your committee. Mr. Batcheller, while before the

committee, qualified his approval of the plan to connect the post-office with railway depots; but expressed unqualified approval of the plan to connect stations by pneumatic tubes. Your committee believes that the use of tubes to interchange mails between stations would result in vastly improving the local service, and, in a great measure, would be a solution of the problem of transporting urban mails.

ADVANTAGES OF THE TUBE SYSTEM.

The principal advantages to come from the operation of a pneumatic-tube system would be:

First. In connecting postal stations. —

Second. In connecting postal stations with railway depots.

Of the two advantages, the first appears to the committee to be of a more demonstrated practical value than the second. The second would be of equal importance with the first if it were absolutely demonstrable that the mails could be transferred with greater rapidity than at present. It is asserted, though the assertion is qualified, that this can be demonstrated, and if it can, your committee will gladly welcome the improvement in the local service, which it would be certain to bring about.

Underground communication between the depots and postal stations under proper conditions ought to enable the post-office to reduce the time it takes to transport mail between these points. The depot problem in Chicago, in this connection, is an important one. The distance from the general post-office to the Union depot is 1.282 miles, and the running time of the messenger is thirty minutes.

The distance from the general post-office to the Northwestern depot is 0.906 of a mile, and the running time of the messenger is twenty-seven minutes.

The distance from the general post-office to the Illinois Central depot is about 1 mile, and the running time is thirty minutes.

Both the Union and the Northwestern depots are beyond the river, and the wagons are often delayed during certain hours of the day by open bridges. In addition to this, the wagons have to travel through the congested portions of the city, where it is absolutely impossible to make rapid time.

In the case of the Illinois Central depot the conditions are better, as the wagons use Michigan boulevard, which is not particularly congested south of Monroe street, nor is there any river to cross. Pneumatic-tube service, as evidenced by the experience of other cities, enables the post-office to send at least 90 per cent of all mail direct to the connecting points, and if the mail could begin to be sent within five or ten minutes of its arrival at the depot it would mean on a close connection that all mail sent by way of tubes from a depot ought to reach a station on the line, be distributed, and in the hands of the carriers in less time than it takes to drive a wagon loaded with mail from a depot to the general post-office.

On page 161 it is shown that 63,800 pieces of letter mail could have been advanced one delivery had a quicker method been in vogue of transmitting mails from the railway depots to the general post-office. A conservative estimate of the number of pieces which could be advanced one delivery at stations, or one and one-half hours earlier, were pneumatic tubes capable of transmitting this mail with the rapid-

ity desired, indicates the large number of 100,000 pieces daily. We really believe that the number would be greater, but place the estimate low in order to be on the safe side. No sound estimate can be given of the second, third, and fourth class mail that could be expedited in delivery, but undoubtedly a marked improvement in the delivery of these classes of mail would follow the establishment of the pneumatic-tube service.

By connecting the Union, Northwestern, and Illinois Central depots and the general post-office on a pneumatic-tube line, it would be possible to establish stations in the Northwestern and Illinois Central depots (there is one now in the Union depot), which would result in a considerable saving in the cost of carrier service. Such a system would provide, were it possible to transmit mail as rapidly as it is claimed, for the simultaneous delivery of all important mails in the business center of the city. It should be remarked that this is not possible now, and the mails are delivered one or two trips earlier or later, according to the proximity of the stations to the railway depots.

By the establishment of tubes connecting the three depots mentioned with the general post-office, Board of Trade, and Southwater stations it would be practicable to reorganize the down-town collection service and center all collections on the tube stations. Such a reorganization would result in materially expediting the dispatch of outgoing mail, the dispatch of local mail, and the deliveries generally. It would also permit a curtailment of the north and west sides street-railway post-offices, which would be an element of economy as against the additional cost of the pneumatic tubes. The curtailment of these lines would enable the post-office to keep them entirely off the congested streets of the business center, thus increasing their speed and extending their usefulness. These lines would center on the Union and Northwestern depots, and the tubes would then make the necessary local mail connections.

By the establishment of tubes connecting the general post-office with the Illinois Central Depot, Twenty-second street, Armour, and stock yards stations the delivery, dispatching, and collection service of the whole South Side would be revolutionized. Further, one of the South Side street-car lines probably could be cut out, and the route of the remaining line changed, so as to provide a system of exchanges between the pneumatic-tube stations on the South Side and the stations without tubes.

The tube connection outlined would practically provide simultaneous delivery of first-class mail at the stock yards, Armour, Twenty-second street, general post-office, Board of Trade, Union and Northwestern postal stations. It is needless to dilate upon the important character of the commercial interests of the stock yards district and how necessary improved service is. The main reason for extending the tubes to the stock yards is to meet the wants of the commercial interests of this district and to provide a method of remedying the grievance in connection with the service which now exists.

Pneumatic tube service between the South Side stations would render it practicable to center the collections in a large area of territory on the tube stations, thereby rendering it possible to promptly collect mail intended for local delivery (as well as outgoing mail) through the stations on the other sides of the city.

IMPROVEMENT IN LOCAL SERVICE.

In this connection there is urgent need for improvement in the local facilities for the collection, dispatch, and delivery of local mail. At present it takes almost as long to get a letter from the center of the city to an outlying station as it does to get a letter from Chicago to post-offices situated 50 miles away on railway post-office routes. Local mail is more profitable to handle than outgoing mail, and anything that tends to facilitate the rapid delivery of local mail is certain to bring large returns to the Department. The use of pneumatic tubes would increase the cost of the local service undoubtedly, but if the cost were met by a large increase in the revenue the investment would be a profitable one. While the population and business of Chicago have grown at an extraordinary rate in twenty years, the receipts of the service in the same period have grown at a still more extraordinary rate. This is mainly due in the first place to improvements effected in the transportation of mail on the railroad lines and in a lesser degree to the improvements effected in the local service.

The following table is of interest, as showing the growth and receipts of this office during the period covered:

1879.....	\$1,094,807.77	1890.....	\$3,142,493.11
1880.....	1,254,921.65	1891.....	3,525,724.56
1881.....	1,450,690.70	1892.....	3,970,276.94
1882.....	1,749,690.88	1893.....	4,694,905.47
1883.....	1,959,902.41	1894.....	4,476,307.19
1884.....	1,892,241.66	1895.....	4,621,013.45
1885.....	1,930,363.71	1896.....	5,224,659.76
1886.....	2,030,975.66	1897.....	5,155,511.40
1887.....	2,226,877.89	1898.....	5,659,186.88
1888.....	2,470,439.11	1899.....	6,149,470.15
1889.....	2,793,765.34	1900.....	6,609,218.72

The improvements effected in the local service in all cases have led to a large increase in the number of letters mailed for local delivery. In the whole year 1870, the number of letters mailed and delivered was 1,199,232, while in six days in 1895 the number of local letters and cards mailed and delivered was 1,220,652. In 1900 it is estimated that the number of local letters and cards mailed and delivered in six days will be about 1,800,000. Improvements in the service were followed in all cases by a large increase in the revenues of the post-office. In 1894 54 independent post-offices were consolidated with the Chicago post-office, and the connections between stations improved in time from 24 to 50 per cent. In two years after this change the receipts increased from \$4,476,307.19 in 1894 to \$5,224,659.76 in 1896. In 1897, 1898, and 1899 still further improvements were made in the local delivery and collection service and the receipts increased from \$5,155,511.40 in 1897 to \$5,659,186.88 in 1898, \$6,149,470 in 1899, and \$6,609,218.72 in 1900. The matter, therefore, is a plain business proposition. Improvements in the local service it is shown have been followed by increases in the revenue of the post-office which have more than returned the cost of the improvements. It is clear that the establishment of the pneumatic tubes must be followed by an increased number of deliveries and collections in order that the real advantages of the tubes may be reaped by the public and the postal service. It is sometimes held arbitrarily that a certain number of collections and deliveries in business districts and a certain

number of collections and deliveries in residential districts are sufficient. This is undoubtedly true when applied to a given set of conditions. When the conditions are changed, however, the reasoning must change with the conditions. If the use of the pneumatic tubes, as is predicted, will bring about a large increase in local revenues there is no reason why the collections and deliveries should not be increased in number. No arbitrary number of collections and deliveries can be assumed. If the public, because of the increased facilities, mail an increased number of letters the postal service must provide for the quick delivery of these letters. This is a business proposition and when increased service gives increased mail and a revenue more than sufficient to repay the increased cost of the service it is merely a wise business policy to largely augment the facilities.

LOCAL SPECIAL-DELIVERY SERVICE.

What can be accomplished in the growth of the special-delivery service by the use of pneumatic tubes is largely conjectural, but it is certain that with the advent of tubes this service would be further developed and the revenues from it greatly augmented. Mr. Batcheller is of the opinion that with tubes for the use of the special-delivery service it would in a short time rival the local messenger system, and that the revenues would in time pay the cost of installing tubes. This opinion is an optimistic one, but there is a measure of truth in it, and the committee believes that the revenue from the local special-delivery service would be greatly increased by the use of tubes, and that the special-delivery service could be relied on to more than return its share of any expenditures entailed by the installation of the tubes. Even without tubes, and proceeding entirely from improvements effected by the local post-office, the special-delivery system in Chicago has made rapid headway.

The following table shows local special-delivery matter handled each year since 1894:

Matter of local origin for local delivery.

1894	34,663	1898	44,532
1895	35,475	1899	65,989
1896	38,610	1900	90,708
1897	41,333		

In April, 1898, the special-delivery system was reorganized and a force of uniformed messengers appointed. The better facilities thus afforded were immediately appreciated by the public and the number of pieces for local delivery increased from 44,532 in the fiscal year ended June 30, 1898, and 65,989 in the fiscal year ended June 30, 1899, to 90,708 in the fiscal year ended June 30, 1900.

NO SPECIAL FEES FOR TUBE SERVICE.

Your committee is of the opinion that a system of special fees for letters sent through the tubes is not advisable. The chief distinction of the United States postal service now is that it is entirely free from the graduated fee system which prevails in many other countries, and that the best general service is given to everyone at the usual rate of postage. We believe the aim of the postal service ought to be to

develop the ordinary service so that it will not be necessary to establish any system of graduated fees. In other words, the postal service generally should aim to give the best facilities to everyone at a fixed rate of postage. The special-delivery service of course stands apart and is not under consideration in this connection.

SIZE OF TUBES.

Your committee is of the opinion that the 8-inch tubes throughout would give the maximum of service and in the end would be more satisfactory than tubes of smaller dimensions. This fact is concurred in by those who have had practical experience in the construction and management of pneumatic-tube systems.

SPACE AT TERMINALS.

Your committee is of the opinion that space can be found in existing stations, or stations to be established, for all necessary tube terminals.

STEAM VS. ELECTRICITY.

It is further of the opinion that a system directly operated by electricity is preferable to a system directly operated by steam.

SAFETY OF MAIL.

Your committee believes that with a pneumatic-tube system reasonably free from disturbance on account of accidents or breakdowns the mails would be afforded much greater security than by any system of overground transportation. In addition, the delays now met with on account of congested streets would be entirely overcome.

ECONOMIES.

Your committee believes that with a good system of pneumatic tubes extending to the points recommended economies could be brought about in connection with the carrier service, the street-car railway postal service, and the messenger service. No figures showing possible economies can be given at this time, for the reason that the members of the committee have had no actual experience in the management of a tube system and do not care to venture an absolute opinion in regard to a subject on which only actual experience gives one the right to speak with authority. The committee, however, can say unreservedly that if the tubes will transport the major portion of the mail in a brief time, there is no reason why great economy should not be brought about in many directions.

OWNERSHIP OR RENTING.

Your committee believes—apart entirely from the speculative or theoretical phases of the question—that at this time it would be more advantageous for the Government to rent a pneumatic-tube system than to own one outright. The pneumatic-tube system, as applied to general post-office work, is yet in its infancy, and is bound to be improved as time goes on. The Government, by becoming a renter, would be in a position to take advantage of improvements in the sys-

tem. Should it purchase the system as at present constructed, in ten years it would have on its hands a system practically out of date, and would be compelled to again enter the market. In addition to this, there is the possibility of the development and improvement of the electric underground system, which would enable the post-office to handle the mail in bulk. The chief argument against the pneumatic-tube system is the fact that it makes necessary the breaking of bulk in a large number of instances, or, if not the breaking of bulk, then the establishment of dispatching sets at railway depots to obviate the loss of time. Even with this defect, the system presents many splendid advantages; but the possibility of improvements on other lines ought not to be overlooked, and for these and other cognate reasons the committee is of the opinion that it would be more business-like for the Government to rent a system than to own it.

USE OF LATERALS.

Your committee can not give a conclusive opinion upon the question of laterals to be used in connection with main pneumatic tubes. Mr. Fordyce, of the American Pneumatic Tube Service Company, who has expert knowledge of this subject, is of the opinion that laterals are practicable and could be used with great efficiency. If it can be shown that laterals are practicable, your committee is of the opinion that their use would be a development of the pneumatic-tube service likely to have an important effect on the delivery and collection service in the downtown district. Even with the best system of collection, mail ordinarily lies in letter boxes anywhere from a quarter to three-quarters of an hour, and misses certain connections that might be made if this delay were prevented. Were a system of laterals in vogue connecting important business houses with the main pneumatic tubes, direct deliveries and dispatches of mail could be made. We assume that in such cases the cost of the laterals would be borne by the firms benefited. The committee does not feel justified in making any predictions, but it has good reason to think that the establishment of pneumatic tubes and the development of the lateral idea would in the long run effect an enormous saving in the cost of the collection and delivery service, as well as improving the service immeasurably.

CALLING FOR BIDS.

The committee having reached the conclusions herein stated, feels justified in urging the Department to secure authority from Congress for additional outlay to provide an underground system of pneumatic tubes, and has invited the attention of the companies operating pneumatic-tube and electric systems to the proposed recommendation and requested them to advise this committee as to what it would cost approximately to construct such a system. In accordance with the instructions to the local committee, contained in section 10, page 159, of this report, a letter was sent to each of the following companies or persons named hereafter, requesting data as to the cost of the pneumatic-tube service outlined herein:

Batcheller Pneumatic Tube Company.

American Pneumatic Service Company.

Nels Sampson Combined Curb and Conduit Company.

Max Frank.

Bostedo Package and Cash Carrier Company.

Following is a copy of the letter sent to each of the prospective bidders.

NOVEMBER 5, 1900.

SIR: In accordance with departmental instructions, this office desires to secure a definite statement from you concerning the cost of a pneumatic-tube service for the purpose of transporting mails between postal stations now at the points mentioned or to be hereafter established.

First. A line of 8-inch tubes extending from the present temporary post-office building to Southwater station, 15 La Salle street, and from Southwater station to a point in the Northwestern Railway depot, Kinzie and Wells streets, or contiguous to the Northwestern Railway depot, and return to the temporary post-office by the same route.

Second. A line of 8-inch tubes extending from the temporary post-office building to the Board of Trade station, 117-119 Quincy street, and from the Board of Trade station to Station U in the Union depot, Jackson and Canal streets, and return by the same route.

Third. A line of 8-inch tubes extending from the temporary post-office building to the Illinois Central depot to connect with a station to be established in this depot, from the Illinois Central depot to Twenty-second Street station, corner Indiana avenue and Twenty-second street; thence to Armour station, to be removed to Thirty-first street and Indiana avenue; thence to a proposed station at Thirty-first and Halsted streets; thence to Stock Yards station, 4193 South Halsted street, northeast corner Forty-second street, and return by the same route.

Please advise this office as to the probable rental necessary to secure the full operation of such lines. Please report as to the most economical routes to be taken, naming streets, alleys, etc., in the event that the lines mentioned were to be established. Also advise as to the character of the plant you would install, the actual space you would require at terminal or intermediate stations; also, the character of the power to operate the system, whether electricity or steam. I would be glad if you would further advise me as to the capacity of the tubes you would install, whether 8 inches or more in diameter. Also advise what quantity of mail matter such a system of tubes would carry if operated steadily during a given time, and the length of time it would take to transmit mail matter from one station to another. Please advise me further what additional expense such a system would entail for the employment of clerks to take care of the tubes in the different stations.

Kindly furnish this information as early as possible, and not later than November 17, as it is important we should have it in order to proceed with our investigation.

Very truly,

CHARLES U. GORDON, *Chairman.*

The data called for in the foregoing letter have not yet been received. On their receipt a supplementary report will be made to the Department, covering the cost, right of way, and other technical details in reference to the establishment of the pneumatic-tube service in Chicago. These data will undoubtedly be in the hands of the local committee by the time the departmental committee reaches Chicago (about the 20th or 21st of November), and the subject can then be finally considered by the two committees.

Respectfully submitted.

CHARLES U. GORDON,
E. L. WEST,

Local Committee.

Exhibits A, B, and C sent under separate registered cover.

GENERAL POST-OFFICE,
BUREAU OF CORRESPONDENCE, EXECUTIVE DIVISION,
Chicago, Ill., November 28, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The joint committee on the pneumatic-tube service proposed for the city of Chicago have had several conferences considering the questions that have been brought up in connection with the subject of

pneumatic-tube service. The preliminary report addressed to the honorable Postmaster-General, submitted by the local committee under date of the 17th instant, has been carefully reviewed by the joint committee, approved, and forwarded to the Department, with the recommendation that it receive careful consideration.

The estimates or propositions asked for by the local committee of the various companies or persons interested in providing pneumatic-tube service or service by other similar devices has resulted in proposals being received from the following companies:

1. The Chicago Pneumatic Service Company, offices Western Union Building, Chicago, Ill., operating under the Batcheller system of patents.

2. The American Pneumatic Service Company, offices 89 State street, Boston, Mass., operating under the Fordyce system of patents.

3. The Frank Electrical Pneumatic Company, offices Chicago Electrical Institute, 477 Larrabee street, Chicago, Ill.

4. The Sampson Combined Curb and Conduit System, offices Norwood Park station, Chicago, Ill., operating underground electric service under the Sampson underground electric service system.

The proposition received from the latter company, while indicating some merit, is not sufficiently definite to enable this committee to properly examine and pass upon its practicability, and we simply suggest that the Department acknowledge the receipt of it and thank the company for the time given to the subject.

Referring to No. 3, this committee forward it as received without passing upon any of the points involved in this system and can only suggest that the Department follow the same course as is recommended in the case of the Sampson Combined Curb and Conduit System.

The estimates and proposition submitted by the American Pneumatic Service Company have been carefully examined and are forwarded herewith for the consideration of the Department. The amount of this company's estimate is greater by about \$70,000 than the estimate received from the Chicago Pneumatic Service Company.

Referring to the proposition of the American Pneumatic Service Company, which we have separated into the several items of power, labor, repairs, depreciation, etc., we find it represents the power as being \$63,105 per annum; labor in operating, \$43,620; repair of carriers, \$4,977; general expenses, \$5,170; depreciation of power plant and pipe line, \$25,981; 10 per cent of cost of construction, \$47,567.

The items of interest on the cost of construction, depreciation, and taxes combined represent a charge of \$89,468, about 42 per cent of the total amount of the rental asked for per annum.

Referring to the proposition of the Chicago Pneumatic Service Company, it is shown that the lines upon which the estimates are made amount to 8.78 miles in length; that 8-inch tubes are proposed for the connection of the general post-office with three of the leading railway depots of Chicago, in one of which a postal station is now located, while in the other two it is proposed to establish postal stations; that the lines also connect the general post-office and six of the important postal stations, and one additional postal station proposed to be established at Thirty-first and Halsted streets, making a total of nine postal stations and the general post-office to be served by pneumatic tubes.

The amount named by this company for the rental and operation of this system of pneumatic tubes involves an expenditure of \$143,050.52

per annum, which is based upon a charge for operation of \$66,118 and 10 per cent of the estimate of the cost of construction, which is \$76,932.50. The operating expenses as given in this proposition have been examined by this committee and are considered approximately correct, with the exception of the item of labor in stations; that is, labor for the receiving and dispatching of carriers and for compressor men to attend the motors and machinery in each postal station and railway depot. It is our opinion that this expense (\$28,800) may be reduced by an amount equal to \$18,000 by using the clerks in the general post-office and in the postal stations to assist in receiving and dispatching the tube carriers. The time of clerks to render this service is secured by the installation of the tube service, which will largely discontinue the receipt of mails in locked pouches at the general post-office and the postal stations. The work of opening and dumping, closing, recording, and dispatching the pouches is therefore saved and can be given to the tube service. Allowance is made, however, in this item for a sufficient number of employees to be furnished by the tube company to assist during the busy hours of the day in the handling and receipt of carriers and to take the necessary care of the machinery. In the cost of construction the power station and equipping of it involves an expense, according to the estimates, of \$127,125; equipping the central post-office and postal stations with necessary machinery, \$177,276; laying the pipe line in the streets and connecting it, \$352,190; installing electrical equipment, \$3,000; 456 tube carriers, \$9,120; conduits to connect the power station with the nearest post-office or postal station, \$1,324; or a total of \$673,035.

About \$29,300 of the amount required for the establishment of the power station may be saved by installing the power station for the tube system in the Government building or upon Government property, this being the amount allowed for the purchase of land, erection of building and chimney, and cost of the conduit to connect the power station with the nearest post-office or postal station. It is believed that sufficient space can be had in the present temporary post-office for this purpose at a slight expense for excavating, and we find there is ample room in the basement of the new Government building now in the course of erection.

The remainder of the cost of construction, approximating \$102,630, is made up of the following items:

Freight	\$15,933
Office expenses	4,012
Engineering expenses	12,170
10 per cent to the Batcheller Pneumatic Tube Company	70,515

Of these items the committee believes an allowance of 10 per cent per annum to the company would be unfair, and suggests instead that a fairer basis would be an allowance of 5 per cent per annum, reducing the annual proposed rental by \$5,131.

The total reductions in the estimated annual rental recommended by the committee would therefore amount to the following:

Labor	\$18,000
10 per cent on reduction in cost of power plant	2,930
5 per cent reduction on office expenses, engineering, freight, and Batcheller patents	5,131
The total of these items	26,061
Deducted from the amount of the proposed rental	143,050
Leaves the amount at	116,989

the approximate annual rental for 8.78 miles of proposed pneumatic-tube service, connecting the general post-office with three railway depots and nine postal stations, being an average of \$13,325 per mile.

On this basis the joint committee recommends to the Department the establishment of pneumatic-tube service in Chicago, although we do not state positively that the estimates submitted by the company represent the actual cost of construction; in fact, we are of the opinion that in a large contract, such as this one, better prices can be made for the machinery, for street excavation, and laying pipe than are estimated. A reasonable reduction in these items would reduce the rental to approximately \$100,000 per annum.

The committee refers the proposition of the Chicago Pneumatic Service Company to the Department for its examination and investigation of the details of construction. There has not been sufficient time for us to verify these items in detail, including cost of excavation, price of machinery, etc., nor is the committee competent to perform this duty. The best engineering authority should be had to pass upon these estimates in order that they may be thoroughly verified.

The proposition submitted is accompanied by an estimate of the cost of construction prepared by the Batcheller Pneumatic Tube Company for the Chicago Pneumatic Service Company. The latter figures are submitted by the company for the information of this committee and that of the Department, and they request particularly that they should not be made a matter of publication for the information of their rivals or competitors.

The proposition submitted by this company does not include compensation to the city for the franchise, but it is the opinion of this committee that this item may be waived, as sufficient public interest shown in the matter would undoubtedly secure the franchise without compensation to the city. This may be the more readily accomplished when it is understood by the city authorities that the waiving of the compensation for the franchise would reduce the amount of rental to be paid by the Government.

The assurances given by the Chicago Pneumatic Service Company that their proposition is made in good faith and intended to be faithfully carried out, and that they are willing to meet the prices paid by the Department for similar service in any other city, are favorably noted by this committee.

In view of the fact that the proposed rental of the Chicago Pneumatic Service Company is lower than that of any other company having a practicable system, and in further view of the fact that the Batcheller system to be used by the Chicago Pneumatic Service Company has been shown by regular use in Boston, Philadelphia, New York, and Brooklyn to be well suited to the needs of the postal service, your joint committee favorably recommends the general proposition of the Chicago Pneumatic Service Company, with modifications noted, to the consideration of the Department.

In considering the advantages to be secured by the introduction of the pneumatic-tube service in Chicago, account has been taken of the quicker time in transit between the postal stations to be connected and the general post-office. To place this in concrete form, attention is invited to the table given herewith showing the present service, its frequency and the time in transit, as compared with the tube service.

Following is the table :

	Distance.	Present running time.	By tube at 30 miles an hour.
General post-office to—	<i>Miles.</i>	<i>Minutes.</i>	<i>Minutes.</i>
Board of Trade station.....	0.72	13	1½
Station U.....	1.28	25	2½
Armour station.....	3.10	43	6
Stock-Yards station.....	5.77	54	11½
Twenty-second street station.....	2.10	30	4
Chicago and Northwestern depot.....	.91	28	1
Illinois Central depot.....	1.20	25	1½

The tube service will also secure the simultaneous delivery of mail at all of the postal stations connected, which, by the present methods, is impossible, owing to the distance from the center or the base of supplying the large mails originating in Chicago or arriving in the city by railway trains. The continuous receipt of mails at the postal stations to be connected will also enable the clerical force to complete the distribution of the mails to better advantage than under the present system, which causes it to be received in large quantities at periods varying in time from one to two hours. The accumulated mails received at such periods must be distributed quickly in order to allow the delivery by carriers soon thereafter, and a maximum of clerical force must therefore be provided at the postal stations to handle the accumulated mail. The estimate of gain in the clerical force secured by the tube service may be roughly stated at \$18,000 per annum. This reduction has been applied in reducing the proposition submitted by the Chicago Pneumatic Service Company from \$66,118 to \$48,118.

The saving in the wagon-transportation service pointed out by the local committee in their preliminary report is estimated to amount to probably \$10,000 per year, this including such of the present service between the general post-office and the three railway depots connected and also eliminating such of the transfer service from one depot to another as may be discontinued by connecting such mails by the tube service via the post-office.

The rearrangement of the carrier service by placing in operation postal stations at the Chicago and Northwestern depot and the Illinois Central depot and at Thirty-first and Halsted streets, which is made possible by the installation of pneumatic-tube service, would effect a saving in the time of letter carriers and the fares paid for their transportation of about \$10,000 per year.

The rearrangement of the street railway postal service, eliminating one of the South Side routes and curtailing the West and North Side routes to terminate at the Union and Northwestern depots, would, it is believed, effect a further saving of \$5,000.

The establishment of postal stations in the Northwestern and Illinois Central depots, similar to the Union depot postal station, will allow of the discontinuance of the greater number of pouches now made at the general post-office, to be transferred instead to the depot postal stations. The duplication of direct pouches to be connected via the railway trains will also be prevented by the establishment of the depot postal stations. It is believed that the force of clerks now engaged in pouching such mail at the general post-office can be transferred to the

three depot postal stations and perform the same duties without materially increasing the force required for that purpose. The saving effected by eliminating the duplicate pouches now made at several different stations and by several of the arriving railway post-offices can not be estimated definitely, but that it is important is true, when it is considered that the weight of the equipment used in transporting mails approximates something about 50 per cent of the total weight paid the transportation companies.

It is also believed that the introduction of the pneumatic-tube service in Chicago will, by an arrangement with the Railway Mail Service, secure the adoption of a special pouch to be used only by and for railway post-office trains exchanging mails with the pneumatic-tube terminals, these pouches being of a size to be inclosed in the tube carriers, thus avoiding the repacking of the mails for handling from one branch of the service to the other, which consumes time and requires labor for repacking.

Reference has been made to the benefits to be secured by the special-delivery service, and it is undoubtedly true that this class of mail would receive the greatest benefits from the introduction of the pneumatic-tube service, as the time required for the delivery of such matter would equal or excel the time made by the telegraphic or district-telegraph service. It is not unreasonable to assume that this class of matter would increase fully 100 per cent within a year or so of the introduction of the tube service.

The profit to the Government from the special-delivery service at present is 20 per cent per annum of the face value of the stamps, the balance of the face value of the stamps being paid to the delivery messenger. A count of the special-delivery mails in the districts of the postal stations proposed to be connected by pneumatic-tube service shows that the yearly business at such stations approximately amounts to 200,000 pieces per annum. The profit to the Government on the 20 per cent basis of this amount of business would be \$4,000. If the delivery fee could be reduced from 8 cents to 5 cents per letter in the postal districts served by pneumatic tubes, because of the expected large increase in that business, the profit received by the Department on the estimated business over the present profit will approximate \$10,000 per annum; and we see no reason why such profit should not be considered as an offset of this amount to the cost of the proposed tube service.

At the present time 106 special-delivery messengers are employed in Chicago, and of this number nearly 80 per cent obtain the maximum pay of \$30 per month. The increase of the business in the pneumatic-tube districts would enable each delivery messenger to take out a greater number of letters on each trip than is furnished him at the present time, thus enabling the messenger to still receive the maximum pay of \$30 per month. The area attached to each postal pneumatic-tube district is limited as compared with many of the postal districts in Chicago and where a reduction in the fee from 8 to 5 cents can be recommended. This reduction in fee would be impracticable in many of the other districts because of the distance to be traveled by the messengers in making their delivery.

If it were possible to realize the economies enumerated above, it would be seen that the establishment of the pneumatic-tube service in

Chicago would increase the expenditures for transportation service in Chicago by about \$80,000, which is less than 2 per cent of the net surplus turned over by the Chicago post-office for the last fiscal year.

Respectfully submitted.

J. M. MASTEN, *Chairman,*
 E. W. ALEXANDER, *Superintendent Mails,*
 J. A. MONTGOMERY, *Superintendent Mails,*
General Committee.

CHARLES U. GORDON, *Chairman,*
 E. L. WEST, *Superintendent Railway Mail Service,*
Local Committee.

AMERICAN PNEUMATIC SERVICE COMPANY,
Boston, November 20, 1900.

Messrs. J. M. MASTEN,
Chairman of Commission, and
 CHARLES U. GORDON, *Postmaster, Chicago, Ill.*

GENTLEMEN: I send you herewith an estimate of the cost of construction and operating expenses of the pneumatic-tube systems to be constructed as indicated on plan received from you by this company, and also an estimate of general operating expenses for all the lines proposed. These figures fairly represent the present cost of constructing these lines upon the basis of present market prices for materials. They also include the furnishing of power by this company, which, as you will observe, is estimated on the basis of 3 cents per kilowatt hour. Of course if the charge for this power should vary from this figure, it would make a corresponding variation in the amount of operating expenses.

All of which is respectfully submitted.

AMERICAN PNEUMATIC SERVICE COMPANY.
 W. E. L. DILLAWAY, *President.*

Estimate of general operating expenses, 8-inch sliding-carrier systems.

[Operating hours 4 a. m. to 11 p. m.]

One superintendent.....	\$900
Four repair men, at \$780.....	3, 120
Rent, repair shop.....	600
Power for shop.....	450
Four substitute operators, at \$600.....	2, 400
Two inspectors, at \$600.....	1, 200
One chief engineer.....	900
Engineers:	
Three at post-office.....	
Two at Northwestern depot.....	
Two at Union depot.....	
Two at Twenty-second street station.....	
Two at Armour's station.....	
Two at Stock Yards.....	
} 13 engineers, at \$780.....	10, 140
Telephone service, eight lines, private wire.....	1, 000
Taxes and insurance.....	5, 000
City of Chicago, 5 per cent tax on gross income.....	11, 000
	36, 710
Operating expenses:	
Northwestern line.....	30, 288
Union station line.....	35, 456
Stock Yards line.....	111, 466
	213, 920
Total.....	213, 920

Estimate of cost of construction 8-inch pneumatic-tube system, northwestern line, temporary post-office to Northwestern depot. Station at South Water street station.

[Distance, 4,800 feet.]

9,600 feet of pipe, at \$1.35.....	\$12,960	
9,600 feet of pipe laid, at 35 cents.....	3,360	
4,800 cubic yards excavation, at \$2.50.....	12,000	
6 sets of bends, at \$300.....	1,800	
24 reducers, at \$50.....	1,200	
10 drips, at \$12.80.....	128	
Machine work.....	500	
		\$31,948
Terminals:		
Four transmitters, at \$800.....	3,200	
Two closed receivers, at \$800.....	1,600	
Two open receivers, at \$400.....	800	
Fifty carriers, at \$18.....	900	
		6,500
		38,448
Power plant:		
Four compressors, at \$2,200.....	8,800	
Four motors, at \$1,200.....	4,800	
Piping.....	3,000	
Foundations.....	2,000	
Air tanks, etc.....	1,500	
		20,100
		58,548
Engineering expenses.....	2,000	
Freight, cartage, etc.....	3,500	
		64,048
10 per cent for contingencies.....		6,405
Total.....		70,453

Estimate of operating expenses 8-inch pneumatic-tube system, Northwestern line, temporary post-office to Northwestern depot. Station at South Water street station.

Rent at Northwestern depot.....	\$2,500
Eight operators, at \$780.....	6,240
Wear and tear account, 15 carriers per month, at \$3.95, \$59.25 per month, yearly.....	711
Power—55 horsepower, at 3 cents per kilowatt hour.....	9,535
Depreciation of power plant, 10 per cent.....	2,660
Depreciation of pipe line, 5 per cent.....	1,597
Interest on investment, 10 per cent.....	7,045
Total.....	30,288

Estimate of cost of construction 8-inch pneumatic-tube system, Union station line, temporary post-office to Union station. Station at Board of Trade.

[Distance, 6,775 feet.]

13,550 feet of pipe, at \$1.35.....	\$18,292.50
13,550 feet of pipe laid, at 35 cents.....	4,742.50
6,775 cubic yards excavation, at \$2.50.....	16,937.50
Sixteen sets of bends, at \$300.....	4,800.00
Sixty-four reducers, at \$50.....	3,200.00
Ten drips, at \$12.80.....	128.00
Machine work.....	500.00
	\$48,600.50

Terminals:

Four transmitters, at \$800.....	\$3,200.00	
Two closed receivers, at \$800.....	1,600.00	
Two open receivers, at \$400.....	800.00	
Seventy carriers, at \$18.....	1,260.00	
		\$6,860.00

55,460.50

Power plant:

Four compressors, at \$2,200.....	8,800.00	
Four motors, at \$1,200.....	4,800.00	
Piping.....	3,000.00	
Foundations.....	2,000.00	
Air tanks, etc.....	1,500.00	
		20,100.00

75,560.50

Engineering expenses.....	2,000.00	
Freight, cartage, etc.....	3,500.00	
		81,060.50

10 per cent for contingencies..... 8,106.00

Total..... 89,166.50

Estimate of operating expenses 8-inch pneumatic-tube system, Union station line, temporary post-office to Union station. Station at Board of Trade.

Rent at Union station.....	\$2,500	
Eight operators, at \$780.....	6,240	
Wear and tear account, 15 carriers per month, at \$3.95, \$59.25 per month, yearly.....	711	
Power, 69 horsepower, at 3 cents per kilowatt hour.....	11,962	
Depreciation of power plant, 10 per cent.....	2,696	
Depreciation of pipe line, 5 per cent.....	2,430	
Interest on investment, 10 per cent.....	8,917	
		35,456

Total..... 35,456

Estimate of cost of construction 8-inch pneumatic-tube system, Stock Yards line, temporary post-office to Stock Yards. Stations at Illinois Central railroad depot, Twenty-second street; Armour, Thirty-first street.

[Distance, 30,500 feet.]

61,000 feet of pipe, at \$1.35.....	\$82,350	
61,000 feet of pipe laid, at 35 cents.....	21,350	
30,000 cubic yards excavation, at \$2.50.....	75,000	
18 sets of bends, at \$300.....	5,400	
96 reducers, at \$50.....	4,800	
60 drips, at \$12.80.....	768	
Machine work.....	3,000	
		\$192,668

Terminals:

Ten transmitters, at \$800.....	8,000	
Five closed receivers, at \$800.....	4,000	
Five open receivers, at \$400.....	2,000	
Three hundred carriers, at \$18.....	5,400	
		19,400

212,068

Power plant:		
Ten compressors, at \$2,200.....	\$22,000	
Ten motors, at \$1,200.....	12,000	
Piping.....	7,500	
Foundations.....	5,000	
Air tanks, etc.....	3,750	
		\$50,250
Engineering expense.....		262,318
Freight, cartage, etc.....		10,000
		15,000
		287,318
10 per cent for contingencies.....		28,732
Total.....		316,050

Estimate of operating expenses 8-inch pneumatic-tube system, Stock Yards line, temporary post-office to Stock Yards. Stations at Illinois Central Railroad depot, Twenty-second street, Armour Thirty-first street.

Rent at Illinois Central Railroad depot.....	\$2,500
Twenty operators, at \$780.....	15,600
Wear and tear account, 75 carriers per month, at \$3.95, \$296.25 per month, yearly.....	3,555
Power, 267 horsepower, at 3 cents per kilowatt hour.....	41,608
Depreciation of power plant, 10 per cent.....	6,965
Depreciation of pipe line, 5 per cent.....	9,633
Interest on investment, 10 per cent.....	31,605
Total.....	111,466

CHICAGO PNEUMATIC SERVICE COMPANY,
Chicago, November 27, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
Chicago, Ill.

GENTLEMEN: In reply to your request for an estimate of construction and operation of several lines of pneumatic tubes in the city of Chicago, we beg to submit the following: The proposed lines are those shown on the plan prepared at the Chicago post-office by your committee, and described as follows:

First. A line extending from the present temporary post-office building to South Water station, 15 La Salle street, and from South Water station to a point in the Northwestern Railway station, Kinzie and Wells streets, or contiguous to the Northwestern station, and return to the temporary post-office by the same route.

Second. A line extending from the temporary post-office building to the Board of Trade station, 117-119 Quincy street, and from the Board of Trade station to Station U in the Union depot, Jackson and Canal streets, and return by the same route.

Third. A line extending from the temporary post-office building to the Illinois Central depot, to connect with a station to be established in this depot; from the Illinois Central depot to the Twenty-second street station, corner Indiana avenue and Twenty-second street; thence to Armour station, to be established at Thirty-first street and Indiana avenue; thence to a proposed station at Thirty-first and Halsted streets; thence to Stock Yards station, 4193 South Halsted street, northeast corner Forty-second street, and return by the same route.

We have made a careful examination of the streets and suggest the following routes for the above-mentioned lines, subject to such changes as may be necessary by condition of streets and subject to the approval of the commissioners of public works and other city authorities:

Line No. 1.—From the temporary post-office up Washington street to La Salle, up La Salle to South Water street station, thence into La Salle street tunnel, through the tunnel into Chicago and Northwestern Railway station.

Line No. 2.—Follows the Illinois Central tracks to Adams street, across open ground to Michigan avenue, thence west on Adams street to Clark, thence on Clark to Quincy, along Quincy to the Board of Trade post-office, thence along Quincy to Franklin, Franklin to Van Buren street tunnel, through the tunnel to Clinton, up Clinton to Jackson, back on Jackson to Station U, Union depot.

Line No. 3.—From the temporary post-office along the tracks of the Illinois Central Railroad to the Illinois Central depot; thence underneath the shed to a point at which mail is loaded upon the trains; there being no mail room here, one would have to be constructed, but the cost of such construction is not included in this estimate. From the mail room the line continues from the railroad tracks to Sixteenth street, emerging through the exit gate into Sixteenth street. The line turns from Sixteenth street into an alley running south between Indiana avenue and Prairie avenue; from the alley into Twenty-second street, Station L, at Indiana avenue, to Thirty-first, entering Station Armour; from Station Armour down Thirty-first street to Fifth avenue; thence it follows an alley to Halsted street, entering the new station to be established there, and from the station the line follows the alley parallel to Halsted street, to Station K, the Stock Yards station.

	Miles.
General post-office (temporary) to Illinois Central Railroad depot.....	1. 080
Illinois Central depot to Twenty-second street station.....	1. 193
Twenty-second street station to Armour station (new).....	1. 023
Armour station to Halsted street station (new).....	1. 363
Thirty-first and Halsted to Stock Yards.....	1. 439
General post-office (temporary) to Board of Trade.....	.881
Board of Trade to Union depot (Station U).....	.720
General post-office to South Water street.....	.781
South Water street to Chicago and Northwestern Railroad depot.....	.300
Total.....	8. 780

For the operation of all these lines we propose the erection of a central power station, to be located at some convenient point along the line of a railroad, at a distance not more than half a mile from one of the postal stations, preferably as near as possible to the center of the system. In this central power station we will erect boilers and engines with directly connected dynamos which will generate electric currents of high voltage. We propose the laying of underground conduits beside the tubes, with cables drawn into the conduits, by means of which electric power can be distributed to all the postal stations. In each postal station we propose the erection of air compressors or blowers driven by electric motors, which will draw their energy from the central power station. In order that the electric cables for the distribution of power shall not be too large, a high voltage will be used, with transformers at each postal station to transform from a high to a low voltage a sufficient amount of electric current to operate the motors in the respective stations. The equipment of each station will include, besides the motors and transformers, switch boards and all necessary instruments. Each blower or air compressor would have an electric motor geared to it, which makes it very compact, occupying a small amount of space. Such a system of power distribution reduces the space occupied by the tube apparatus in the postal stations to a minimum. Furthermore, it avoids the use of steam engines and boilers in the post-offices.

For the line equipment we propose the use of cast-iron tubes bored smooth and accurate on the interior, and similar in all respects to the tubes now in use in New York, Philadelphia, and Boston. The carriers will travel upon bearing rings composed of a material selected after long experience. We adopt this construction of a bored tube and sliding carriers from the following considerations: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man, and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design, which results in giving the tube an enormous carrying capacity, so that, for example, an 8-inch tube may be used for a service that would otherwise require a 10-inch tube.

Within the postal stations we propose the use of our latest improved transmitters and receivers. The transmitters will be of an improved type, much more compact and simple in operation than those now in use by the Government. The receivers will be of a new and simplified type which permits having the end of the tube open so that carriers are free to come out, however frequently they may be dispatched. There is no mechanism to get out of order and interrupt the passage of the carriers from the tube to the receiving table. We can not lay too much emphasis upon the use of this improved type of receiver. It increases the capacity of the line two or three times by allowing the carriers to be dispatched so much more frequently, and

the carriers are brought to rest gradually without shock, avoiding the danger of injury to fragile articles. Several of these receivers have been constructed, one of which was on exhibition at the Paris Exposition.

There is no element of a pneumatic-tube system upon which success depends to so great an extent as upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched, and emptied at each station during each day. Lightness, simplicity, and facility of opening are essential qualifications. The carrier proposed by us will be similar in design to those used in connection with the present existing lines constructed under the Batcheller patents in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds and will open for its full diameter at the rear end.

The latter feature greatly facilitates filling and emptying, as compared with the carrier opening at the side. We find that the friction of the carrier in traveling the tube is inconsiderable. Our preference for this type of carrier would not be altered if the friction were considerable, for at its maximum the friction of the carrier is small compared with that of the column of air. The bearing rings of this carrier travel 10,000 miles without renewing, and as they fit closely to the walls of the tube, they reduce the leakage past the carrier to a minimum.

When this system is installed, carriers can be dispatched at the rate of 10 per minute; therefore the capacity of each section of each line will be 6,000 letters per minute, 360,000 letters per hour, or 7,200,000 letters per day, in each direction. The capacity for mail of other classes will of course be somewhat less. The average speed of the carriers will be about 44 feet per second; therefore the time of transit of a carrier between the temporary post-office and the Illinois Central depot will be two minutes and ten seconds.

Of course it is impossible to give an accurate estimate of the cost of constructing such a system until the rights of way have been obtained and the ground purchased for the erection of a power house. We have estimated, however, as carefully as possible, that the complete system above described can be installed for the sum of \$769,325.24.

No allowance has been made for the extra cost of laying the tubes through the tunnels under the river, which may be a considerable item. No allowance has been made for the cost of obtaining the rights of way.

COST OF OPERATION.

The cost of operation for 20 hours per day and 310 days in the year has been estimated as follows:

Superintendence	\$3,420.00	Ashes removed	\$2,820.00
Office expenses	2,236.00	Repair shop, labor	4,076.00
Office labor	1,612.00	Auxiliary power	155.70
Stations, labor	28,800.00	Carrier repairs	4,077.50
Power-station, labor	4,454.00	Machinery supplies	450.00
Coal	10,380.00	Repair supplies	2,750.00
Water	644.80		
Supplies	242.00	Total	66,118.00

The above estimate of the central power station provides for salaries of two engineers, two fireman, and two electricians, which is the minimum complement of attendants.

The item of office labor provides for bookkeeper, stenographer, and office boy.

A proper supervision of the system will require a superintendent and two assistants.

The office expenses comprise the office rent, the charge for telephone service, and the item of stationery and postage.

The repair shop must be provided with a complement consisting of master mechanic, an electrician, two machinists, and two machinists' helpers.

A considerable quantity of oil and waste will be required at the central power house, the repair shop, and each of the postal stations. Much waste is used in wiping the carriers, which must be kept scrupulously clean.

Operators to the number of thirty-two will be required at the postal stations to receive and dispatch carriers, and compressor men to the number of sixteen to attend to the compressors.

The items of taxes, insurance, and franchise are omitted from the above estimate, as they are indeterminate at this date. A corporation tax will probably be imposed

upon the company operating this system and the machinery may be taxed as personal property.

The rental of the system, if operated by us, would cover the operating expenses and 10 per cent on the construction. This we consider to be only a fair and equitable return for the investment. Upon this basis the estimated rental will be as follows:

Operation.....	\$66, 118. 00
10 per cent on construction.....	76, 932. 50
Total	143, 050. 50

In submitting the above estimates we desire to remind your honorable committee that the construction herein described contemplates the latest and most improved devices known to pneumatic-tube service, including the use of electricity (instead of steam) as motive power. The use of electricity requires the purchase of a large plant of ground in the heart of the city, and the erection thereon of an expensive power house, besides the laying of underground conduits the entire distance covered by the several lines. This construction is vastly more expensive than the old-style system now in operation in New York, Boston, Philadelphia, and Brooklyn, and makes it possible to secure the same amount of service with an 8-inch tube as could be had under the old style of construction with a 10-inch tube.

This company invites the most rigid inspection and examination of its detailed figures by your committee, or by any expert engineer in the country, to be selected by your committee, and we offer every facility possible for said examination, to the end that your committee may be positively assured that the estimates herein contained are entirely reasonable, both as to cost of construction and cost of operation.

This company further proposes and will contract to construct and operate pneumatic-tube lines in the city of Chicago at as reasonable a price for construction and operation (local conditions and character of service being about equal) as may be offered by any other company for any of the other principal cities in the United States.

This company also offers, in case they are awarded the contract for Chicago, to give good and sufficient bond in any reasonable sum required, satisfactory to the Postmaster-General, for the faithful performance of its contract.

Very respectfully,

CHICAGO PNEUMATIC SERVICE COMPANY,
By WM. R. KERR, *General Manager.*

Estimate of cost of construction of proposed pneumatic-tube system at Chicago, Ill., by Batcheller Pneumatic Tube Company, Philadelphia, Pa.

CENTRAL POWER STATION.

Ground.....	\$10, 000. 00
Building.....	12, 000. 00
Chimney.....	3, 000. 00
Engines and dynamos.....	71, 500. 00
Boilers.....	9, 000. 00
Condensers.....	5, 000. 00
Pumps.....	750. 00
Coal hoist.....	600. 00
Ash hoist.....	300. 00
Foundations.....	3, 000. 00
Steam and water piping.....	4, 875. 00
Switch boards.....	2, 000. 00
Wiring and lighting.....	500. 00
Traveling crane.....	1, 500. 00
Plumbing and gas fitting.....	250. 00
Repair equipment.....	2, 500. 00
Furniture.....	100. 00
Telephone exchange.....	250. 00
Total	127, 125. 00

TEMPORARY POST-OFFICE.

Three transmitters	\$3,000.00
Three receivers	2,100.00
Four compressors	10,000.00
Piping	3,000.00
Four foundations	1,000.00
Erection	900.00
Plumbing	225.00
Lockers	150.00
Repair of building	300.00
Three tanks	345.00
One telephone	25.00
Three electric motors, 30 horsepower	2,536.35
One electric motor, 20 horsepower	681.81
Eight transformers	1,282.00
Switchboard	307.69
Three telephone-cable heads	24.00
Total	<u>25,876.85</u>

EQUIPMENT OF POSTAL STATIONS—SUMMARY.

General post-office (temporary)	\$25,876.85
Illinois Central depot	19,026.54
Twenty-second street station	19,026.54
Armour station	19,935.64
Thirty-first and Halsted streets	20,390.19
Stock yards	12,921.69
Board of Trade	11,685.31
Union depot	18,862.90
South Water street station	18,312.14
Chicago and Northwestern Railroad depot	11,238.35
Total	<u>177,276.15</u>

LINE F, TEMPORARY POST-OFFICE TO BOARD OF TRADE.

81,910 feet iron tubing	\$13,365.00
26 brass bends	6,500.00
89 short lengths	89.00
13 dutchmen	975.00
18 drips	576.00
4,650 feet trench laying	6,510.00
Entering tubes in post-office	1,000.00
556 square yards paving (asphalt)	1,112.00
1,112 square yards paving (granite)	1,112.00
4,560 feet power cables	3,115.50
4,560 feet telephone cables	702.15
4,560 feet conduits	1,813.50
13 manholes	650.00
Total	<u>37,520.15</u>

SUMMARY OF LINES.

A	\$39,898.70
B	46,532.90
C	41,176.40
D	52,680.20
E	51,683.60
F	37,520.15
G	33,943.80
H	31,620.54
I	17,134.16
Total	<u>352,190.45</u>
Installation of electrical equipment	<u>3,000.00</u>

CONDUITS AND CABLES.

From power house to nearest station (2,640 feet), including excavating, filling, and paving trench	\$4,324.45
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ENGINEERING EXPENSES.

One engineer (chief)	\$3,000.00
One assistant engineer, first	1,800.00
One assistant engineer, second	1,200.00
Three inspectors, at \$720	2,160.00
One chief draftsman	1,200.00
Six draftsmen (six months)	2,160.00
One instrument	150.00
Drawing-room supplies	500.00
Total	12,170.00

OFFICE EXPENSES.

Bookkeeper	\$780.00
Stenographer	624.00
Office boy	208.00
Office rent	1,300.00
General expenses	600.00
Furniture	500.00
Total	4,012.00

COST OF CARRIERS.

456 8-inch carriers (2 sets), at \$20	\$9,120.00
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FREIGHT.

	Pounds.
91,900 feet tube, at 60 pounds	5,514,000
16 transmitters, at 3,400 pounds	54,400
16 receivers, at 2,000 pounds	32,000
456 carriers, at 20 pounds (8-inch)	9,120
180 drips, at 400 pounds	72,000
180 surface boxes, at 50 pounds	9,000
Total	5,690,520

56,905.2 hundredweight, at 28 cents	\$15,933.46
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COST OF CONSTRUCTION—FINAL SUMMARY.

Central power house	\$127,125.00
Equipment of postal stations	177,276.15
Construction of lines	352,190.45
Installation of electrical equipment	3,000.00
Conduits from power house to nearest station	4,324.45
Engineering expenses	12,170.00
Office expenses	4,012.00
456 carriers	9,120.00
Freight on apparatus to Chicago, Ill	15,933.46
10 per cent to the Batcheller Pneumatic Tube Company	70,515.15
Total	775,666.66
Cost of construction per mile	88,344.72

ST. LOUIS.

OFFICE OF THE POSTMASTER,
St. Louis, Mo., October 12, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

DEAR SIR: In accordance with your instructions, your general committee arrived in St. Louis on Thursday morning, October 11, and proceeded to the post-office, where work was begun on the pneumatic-tube inquiry.

The first day was devoted to a close inspection of the main post-office and in traveling over the proposed routes for pneumatic tubes which the local committee, consisting of Mr. Baumhoff, the postmaster, and Mr. Taft, superintendent of the seventh division of the Railway-Mail Service, had laid out. These routes will be discussed below.

The entire morning of the second day, October 12, the committee was closeted in executive session discussing, point by point, the advantages to be derived by the adoption of pneumatic postal tubes in connection with the St. Louis post-office, and in deciding upon the routes which the tubes ought to take in order that these advantages might be best achieved.

After the most careful weighing of all the considerations involved in this pneumatic-tube question, it is the unanimous opinion of your committee that the post-office of St. Louis, Mo., will be splendidly assisted in the modern rapid handling of its mails if the following pneumatic-tube routes are installed and operated under the plan of the postmaster, Mr. Baumhoff.

Route 1.—Main post-office to Union station by shortest and most practicable route. Distance, about 1.5 miles.

Route 2.—Main post-office to relay depot, East St. Louis, Ill., by way of the Eads bridge and tunnel. Distance, 1.66 miles.

Route 3.—Bremen station, North St. Louis, to Arsenal station, via main post-office and along Broadway. Distance, 5.34 miles.

Route 4.—Union station to Vandeventer station by way of Olive street and Vandeventer avenue. Distance, about 2.5 miles. Total, 11 miles each way.

It is believed that most good can be accomplished if routes 1 and 2 are furnished with tubes 8 inches in diameter and routes 3 and 4 with tubes 6 inches in diameter.

The local committee have prepared estimates of the amount of mail which will probably be sent through these tubes, and have also provided maps outlining clearly the streets through which the tubes will pass, but owing to some slight changes in the routes, which the general committee decided on, these estimates and maps will necessarily have to be reprepared. The engineering experts of the Batcheller Pneumatic Tube Company and the American Pneumatic Service Company will also furnish, in connection with the estimates spoken of above, statements as to the probable cost of the installation of these systems and the probable rate of rental.

This report, therefore, must be considered as merely preliminary to the final report, which will be forwarded as soon as all the facts can be known. The local committee have found it impossible to have all the plans and estimates complete when so many facts in a matter like

this are open to doubt and when the estimates made by the local committee are so subject to change.

In conclusion, it may be said that the business men of St. Louis have shown the greatest interest in this project for the advancement of all the leading commercial bodies of mail matter. Representatives of all the leading commercial bodies of the city, including the Merchants' Exchange, Business Men's League, the Manufacturers' Association, and others, asked as a special favor to appear before this committee and to urge upon the members of it the adoption of these modern means for handling mail matter. These gentlemen pointed out to your committee, that since the St. Louis post-office was the most economical in the country, spending but 35 per cent of its gross receipts, it was entitled to recognition in the way of special mail facilities. In this argument the committee fully concurs and considers that the adoption of these four pneumatic-tube routes, as set forth above, is fully justified and can be strongly recommended.

Very respectfully,

J. M. MASTEN, *Chairman.*
 J. A. MONTGOMERY.
 E. W. ALEXANDER.
 STILL P. TAFT.
 F. W. BAUMHOFF.

AMERICAN PNEUMATIC SERVICE COMPANY,
 Boston, October 29, 1900.

J. M. MASTEN, *Chairman of Commission*, and
 F. W. BAUMHOFF, *Postmaster of St. Louis, Mo.*

GENTLEMEN: Replying to your favor of the 15th instant, this company begs to submit:

First. That it will construct, complete, and operate a pneumatic-tube system, in compliance with the first route named in your letter, for the sum of \$24,500 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system as is required for said route for the sum of \$9,500 per year, the Government to pay the operating expenses and taxes thereon.

Second. This company will construct, complete, and operate such a system as is required for the second route named in your letter for the sum of \$26,800 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system as is required for said route for the sum of \$13,000 per year, the Government to pay the operating expenses and taxes thereon.

Third. We will construct, complete and operate such a system as is required for the third route named in your letter for the sum of \$99,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system for the sum of \$46,500 per year, the Government to pay the operating expenses and taxes thereon.

Fourth. We will construct, complete, and operate the system required for the fourth route named in your letter for the sum of \$33,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate such a system for the sum of \$17,000 per year, the Government to pay the operating expenses and taxes for the same.

We beg further to submit, in consideration of the possibilities of an enlarged and future demand upon the pneumatic tube for the transportation of mail in large cities, that a system 10 inches in diameter, such as you have seen at our works at Lowell, Mass., and such as we are now constructing for the Boston company, can be constructed and operated at a saving over the cost of constructing and operating the lines that you have described in your letter as 8-inch and 6-inch lines; and we therefore beg to call your attention to the following proposals, viz:

First. We will construct, complete, and operate a pneumatic-tube system 10 inches in diameter, for the first route designated in your letter, for the sum of \$23,000 per

year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate a system 10 inches in diameter, for the said route designated as the first in your letter, for the sum of \$8,800 per year, the Government to pay all the operating expenses therefor and taxes.

Second. We will construct, complete, and operate a 10-inch pneumatic-tube system between the points designated as the second route in your letter for the sum of \$23,400 per year, the Government to provide the steam power necessary to operate the same; or we will construct, complete, and operate a 10-inch system for said route for the sum of \$11,800 per year, the Government to pay the operating expenses and taxes.

Third. We will construct, complete, and operate a pneumatic-tube system 10 inches in diameter, covering the route designated as third in your letter, for the sum of \$100,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate a system 10 inches in diameter, covering the said route, for the sum of \$47,500 per year, the Government to pay the operating expenses and taxes.

Fourth. We will construct, complete, and operate a pneumatic-tube system 10 inches in diameter, covering the fourth route named in your letter, for the sum of \$32,000 per year, the Government to provide the necessary steam power for operating the same; or we will construct, complete, and operate a 10-inch pneumatic-tube system, covering said route, for the sum of \$18,000 per year, the Government paying the operating expenses and taxes thereon.

Further, this company will guarantee that the operating expenses in case of the use of a 10-inch system shall be less than the corresponding amounts for an 8-inch system, and shall not exceed the amount of the same in a 6-inch system.

We further beg to call your attention to the fact that by reason of the manner in which proposals are asked for we are compelled in estimating the operating expenses to figure upon the maintenance of each system by itself as a whole, which results in the duplication of a number of expenses large in amount for each system, such as inspector, repair man, and superintendent, which, if more than one system were to be constructed and operated in any one city would be considerably reduced, thus reducing the amount of estimates of operating expenses, which we herewith submit. It is also proper to say that these estimates are made without the opportunity to make tests of the conditions of the streets, which might in many respects substantially reduce the cost which is computed for street excavation.

All of which is respectfully submitted.

AMERICAN PNEUMATIC SERVICE COMPANY,
By W. E. L. DILLAWAY, *President*.

THE BATCHELLER PNEUMATIC TUBE COMPANY,
Philadelphia, November 22, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
St. Louis, Mo.

GENTLEMEN: Replying to your request for an estimate of the proposed postal system of pneumatic tubes in the city of St. Louis, we beg to submit the following: Our estimate includes:

First. A double line of 8-inch tubes between the general post-office and the Union depot.

Second. A double line of 8-inch tubes between the general post-office and Relay depot, East St. Louis.

Third. A double line of 6-inch tubes from the general post-office to Arsenal postal station.

Fourth. A double line of 6-inch tubes from the general post-office to Bremen avenue station.

Fifth. A double line of 6-inch tubes from the union railway depot to postal station, Papin street.

It is proposed to lay these lines along the following routes:

Line I.—From the general post-office along Eighth street to Olive street, thence out Olive street to Thirteenth street, thence via alley which is between Olive and Pine streets to Nineteenth street, thence along Nineteenth street to Market street, to Twentieth street, to the mail room in the union railway station.

Line II.—It is proposed that this line shall be laid from the post-office through tunnel to the Eads bridge, thence across the Eads bridge and along the railway tracks to the Relay depot. Of course this assumes that the right of way can be obtained from the railway company.

Line III.—Will extend from the General Post Office along Eighth street to Olive, along Olive to Seventh, along Seventh to Spruce to Cupples station. The line follows Spruce street to Sixth street and Sixth street to Park avenue, thence it would turn into an alley which is parallel to Broadway on the West side, following this alley to a new station to be established at Barry street, from Barry Street station along the alley to Dorcas, through Dorcas street to Broadway, along Broadway to Arsenal Station.

Line IV.—To extend from the General Post Office along Eighth street to Olive street, along Olive to Third street, thence to the Annex station. From the Annex station along Third street to Franklin avenue, along Franklin avenue to Produce station, from Produce station along Fourth to Third, along Third street to Carr, and along Carr to Collins street, thence along Collins and Second to a new station to be established at or near Benton street. From Benton station along Second street to Salisbury street, along Salisbury to Broadway, thence to Bremen station.

Line V.—From the mail room in the Union Railway depot along Twentieth street to an alley which is parallel to Olive street on its south side, along the alley to Compton avenue, north on Compton avenue to a new station to be established near Olive street, out Olive to an alley just west of Theresa street, along the alley to Vandeventer avenue, where a new postal station is to be established. From this postal station along Vandeventer avenue to Papin street, east on Papin to a new postal station that is to be established on Papin street near Lawrence.

The length of these lines is given in the following table:

	Miles.
General post-office to Union depot, 8-inch line	1. 312
General post-office to Relay depot, 8-inch line.....	. 1. 85
Total	3. 162
General post-office to Cupples station, 6-inch line.....	. 578
Cupples to new (Barry) station .....	. 866
New (Barry) station to Arsenal	1. 222
General post-office to Annex .....	. 417
Annex to Produce station .....	. 473
Produce to Benton (new) station.....	1. 506
Benton (new) station to Bremen Avenue station.....	. 994
Union depot to Compton avenue (new).....	1. 375
Compton avenue to Vandeventer and Olive station.....	. 862
New station Vandeventer to terminus, Papin street.....	1. 023
Total	9. 318

For the operation of all these lines we propose the erection of a central power station to be located at some convenient point along the line of a railroad, at a distance not more than half a mile from one of the postal stations; preferably, as near as possible to the center of the system. In this central power station we will erect boilers and engines with directly connected dynamos, which will generate electric currents of high voltage. We propose the laying of underground conduits beside the tubes, with cables drawn into the conduits, by means of which electric power can be distributed to all the postal stations. In each postal station we propose the erection of air compressors or blowers, driven by electric motors, which will draw their energy from the central power station. In order that the electric cables for the distribution of power shall not be too large, a high voltage will be used, with transformers at each postal station, to transform from a high to a low voltage a sufficient amount of electric current to operate the motors in the respective stations. The equipment of each station will include, besides the motors and transformers, switch boards and all necessary instruments. Each blower or air compressor will have an electric motor geared to it, which makes it very compact, occupying a small amount of space. Such a system of power distribution reduces the space occupied by the tube apparatus in the postal station to a minimum. Furthermore, it avoids the use of steam engines and boilers in the post-offices.

For the line equipment, we propose the use of cast-iron tubes bored smooth and accurate on the interior, and similar in all respects to the tubes now in use in New York and Philadelphia and Boston. The carriers will travel upon bearing rings composed of a material selected by us after long experience.

We adopt this construction of a bored tube and sliding carriers from the following consideration: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man, and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design which results

in giving the tube an enormous carrying capacity, so that, for example, an 8-inch tube may be used for a service that would otherwise require a 10-inch tube.

Within the postal stations we propose the use of our latest improved transmitters and receivers. The transmitters will be of an improved type, much more compact and simple in operation than those now in use by the Government. The receivers will be of a new and simplified type which permits having the end of the tube open so that carriers are free to come out, however frequently they may be dispatched. There is no mechanism to get out of order and interrupt the passage of the carriers from the tube to the receiving table. We can not lay too much emphasis upon the use of this improved type of receiver. It increases the capacity of the line two or three times by allowing the carriers to be dispatched so much more frequently, and the carriers are brought to rest gradually without shock, avoiding the danger of injury to fragile articles. Several of these receivers have been constructed, one of which was on exhibition at the Paris Exposition.

There is no element of a pneumatic tube system upon which success depends to so great an extent as upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched, and emptied at each station during each day. Lightness, simplicity, and facility of opening are essential qualifications. The carrier proposed by us will be similar in design to those used in connection with the present existing lines constructed by this Company in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds and will open for its full diameter at the rear end. The latter feature greatly facilitates filling and emptying as compared with a carrier opening at the side. We find that the friction of the carrier in traveling through the tube is inconsiderable. Our preference for this type of carrier would not be altered if the friction were considerable, for at its maximum the friction of the carrier is small compared with that of the column of air. The bearing-rings of the carrier travel 10,000 miles without renewing, and as they fit closely to the walls of the tube they reduce the leakage past the carrier to a minimum.

When this system is installed, carriers can be dispatched at the rate of ten per minute; therefore the capacity of each section of each line will be 6,000 letters per minute, or 360,000 letters per hour in each direction. The capacity for mail of other classes will, of course, be somewhat less. The average speed of the carriers will be about 44 feet per second; therefore the time of transit of a carrier between the general post-office and the Union Railway depot will be 2 minutes and 38 seconds.

Of course, it is impossible to give an accurate estimate of the cost of constructing such a system until the rights of way have been obtained and the ground purchased for the erection of a power-house. We have estimated, however, as carefully as possible that the complete system above described can be installed for the sum of \$876,329.60. This assumes that the ground for the central power station can be purchased for \$5,000 and a building erected for \$13,000. No allowance has been made for the cost of obtaining rights of way or of changing existing underground construction.

COST OF OPERATION.

The cost of operation for twenty hours per day and three hundred and ten days in the year has been estimated as follows:

Superintendents.....	\$3,420.00	Repair shop, labor.....	4,176.00
Office expenses.....	2,236.00	Auxiliary power.....	138.00
Office, labor.....	1,612.00	Carrier repairs.....	3,098.00
Stations, labor.....	32,400.00	Machinery supplies.....	3,000.00
Power station, labor.....	4,454.00	Repair supplies.....	500.00
Coal.....	8,302.00	Taxes.....	1,205.00
Water.....	1,234.00	Insurance.....	1,150.00
Supplies.....	2,820.00		
Ashes removed.....	300.00		
			70,045.00

The above estimate for the central power house includes the items of coal and water, the hauling of ashes, and the salaries of 2 electricians, 2 engineers, and 2 firemen, which is a minimum complement of attendants.

All of the stations combined will require 34 operators and 20 compressor men. The administrative expenses include the salaries of the superintendent and 2 assistants, bookkeeper and stenographer, the office rent, charge for telephone services, and the cost of stationery, postage, and office supplies.

The expense of the repair shop includes the salaries of 1 master mechanic, 1 electrician, 2 machinists, and 2 helpers, together with the cost of the bearing rings for carriers, and machine parts to replace those broken or worn out.

The item of supplies covers oil and waste, a considerable quantity of which will be necessary.

We have estimated taxes and insurance upon the central power station. We have, however, not included the tax upon the tubes or machinery which may be taxed as personal property by your city authorities. We have included no items for securing the rights of way through the streets, nor have we included a tax upon the necessary franchises.

The rental of the system, if operated by us, would cover the operating expenses and 10 per cent on the construction. This we consider to be a fair and equitable return for the investment. Upon this basis the rental will be as follows:

Operation.....	\$70, 045. 00
10 per cent on construction	87, 632. 96
	157, 677. 96
Rental.....	157, 677. 96

This sum of \$157, 677. 96 will be our annual charge for the service, predicated upon the estimates given on the preceding pages of this letter.

Very respectfully,

BATCHELLER PNEUMATIC TUBE COMPANY,
JNO. E. MILHOLLAND,
President.

OFFICE OF THE POSTMASTER,
St. Louis, Mo., November 30, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The committee on pneumatic-tube service projected for the city of St. Louis have had several meetings in this city for the purpose of discussing and laying out the pneumatic-tube service deemed necessary for the prompt and efficient performance of the mail service in this city.

As stated in the preliminary report of October 12, four routes were laid out (1) connecting the general post-office with the Union depot, (2) with the Relay depot at East St. Louis, (3) extending north and south along Broadway for a distance of about 6 miles, and (4) from the Union depot west to the center of the principal residence district of the city (Vandeventer station). These lines were stated as about 11 miles in length, which was the nearest measurement that could be made from the official city maps. The service required to connect the general post-office with the Union depot and with the Relay depot was believed to require an 8-inch tube, while the line on Broadway, north and south, and the line extending from the Union depot to Vandeventer station was believed to require a 6-inch tube.

The local committee called upon the pneumatic-tube companies which we believed in a position to compete for the installation of the necessary tube service for estimates in regard to the cost of furnishing them. Propositions have been received from the American Pneumatic Service Company of Boston, Mass., and from the Batcheller Pneumatic Tube Company of Philadelphia. These proposals are forwarded to the Department, after careful examination and consideration by the joint committee, for such examination and verification as may be decided upon. They have not been particularly examined by this committee to determine the cost of construction of the lines projected for the reason that the propositions received do not state the cost of construction in detail. It has therefore been impracticable to determine whether these estimates can be reduced in any material amount, or whether the cost is properly stated. It is evident, however, from

our examination, that the cost has been placed high enough to secure the installation of the tubes upon the routes stated. In fact, it is believed that the cost has been placed at a high figure in order to cover any contingencies that might arise. It is therefore recommended that the Department proceed to secure the detailed estimates of cost of construction from the two companies whose proposals are herewith submitted. It is understood that such information can be obtained, but it is not certain whether the companies will consent to making their detailed figures a matter of file record in the Department. In other words, it is understood to be possible that the figures may be examined in their offices in Philadelphia and also in Boston.

Referring more particularly to the proposition submitted by the American Pneumatic Service Company, it is noticed that it covers an estimate on the construction and operation of an 8-inch and a 6-inch tube, as requested by the local committee under date of October 15, and also for a 10-inch tube covering the same routes. There is a slight difference in their proposition to install the 10-inch system and operate it over the 8 and 6 inch system, but this amounts to only \$4,700 per annum. The amount named for the installation and operation of the 8 and 6 inch system, aggregating about 11 miles, is given as \$183,300, plus the cost of steam to be furnished by the Post-Office Department. The amount named for the 10-inch system is \$178,400, plus the steam to be furnished by the Post-Office Department. This proposition, it is stated, is made upon the basis of operating each of the four lines independent of each other, and that in the event of the Department contracting for the installation of the four lines as a complete system, the total amount will be considerably reduced, as duplicated expenses, such as for inspectors, repair men, superintendents, etc., will be eliminated. It is also stated that these estimates are made without the opportunity to make tests of the conditions of the streets, which might in many respects substantially reduce the cost which is computed for street excavation.

Regarding the proposition submitted by the Batcheller Pneumatic Tube Company, it is shown that the cost of construction will be \$876,320 for the mileage called for, which, it is stated, approximates 12.48 miles. The routes decided upon at the first meeting of the joint committee were numbered, respectively, 1 to 4, but in submitting this proposition this company has divided the mileage into five lines, 1 to 5. One and 2 of the 8-inch tubes amounts to 3.162 miles and 3, 4, and 5 of the 6-inch tubes, 9.316 miles. The cost of construction in this proposition is given as a whole, the construction being placed upon a basis of 10 per cent of the expense involved, \$87,632 per annum, and the operation at \$70,045, or a total of \$157,677 per annum. In examining into the items of the expense of operation, it is noticed that the power expense is given as \$17,248 per annum; operation labor, \$42,043 per annum; repairs to machinery, carriers, etc., \$10,744 per annum. These items appear to be quite correctly shown, with the exception of the amount named for labor, which it is believed can be reduced by some \$18,600 less than the estimate of the company. This can be done by reason of the assistance that can be given by the post-office clerks in the operation of receiving and dispatching carriers. Allowance is made by this committee for an operator at each tube station upon the system, two at the general post-office, two at the Union depot, two at the Relay depot; and compressormen, two at the general post-office,

two at the Relay depot, and two at the Union depot, with one as a substitute and relief compressorman.

The committee desires to express its preference for the proposition submitted by the Batcheller Pneumatic Tube Company because of the more favorable terms named; and, as their proposition enters into considerable detail, we have been able to examine it with more satisfaction, and feel that it represents more closely the cost of installation and operation of the service. If the proposition submitted by the Batcheller Pneumatic Tube Company, in its cost of construction, was reduced from an average of \$68,570 per mile for the 6 and 8 inch tubes to \$50,000 per mile, it is our judgment it would closely approximate the necessary cost of construction. Such a change would reduce the annual percentage on cost by \$27,632 per annum, which, with the saving in the cost of operation as above, would make a total reduction equal to \$46,232 per annum, or a net cost to the Department per annum for the 12.48 miles, per year, \$111,445; and upon this basis the committee feels disposed to recommend its establishment in this city, as proposed in the preliminary report.

A favorable recommendation for the installation of pneumatic-tube service is reached after a careful consideration of the requirements of the mail service in this city, and the necessity for a considerable improvement therein in order to keep pace with the growth and importance of the city, which is sufficient, aside from the gain in the time of the transit of the mails upon the routes to be covered by the pneumatic tube. Providing efficient facilities for the transaction of the mail business in the large cities has invariably resulted in a large increase in the first-class mail, the most profitable of the different classes, and it is our belief that the establishment of the pneumatic-tube facilities in this city will show more than the usual increases in the first-class mail. The gain in the special-delivery mail, it is conceded, will be very large. The records show that for the year ending June 30, 1900, 84,950 pieces of special-delivery mail were delivered in this city. Of this number, about 20,000 pieces originated within the city. This showing for the population of the city does not indicate a full development of this class of service. With the added facilities secured by the tube service, it is not unreasonable to assume a growth equal to 100 per cent within the next year or two.

The principal gain in the installation of pneumatic-tube service is expected from its greater speed over what can be secured by the wagon or street-car service. The time from the general post-office to the Union depot by mail wagon is twenty-five minutes; by tube it will be two and two-thirds minutes, a gain of twenty-two and one-third minutes. The time from the Relay depot at East St. Louis to the general post-office, St. Louis, by way of the Union depot, is fifty minutes; the time by tube will be about four minutes, a gain of forty-six minutes. There will be a corresponding gain in the time of mails exchanged with the Arsenal and Bremen stations, except that the time by tube will be about five minutes to each, while the present time by street car is twenty minutes.

The gain in time secured by the pneumatic-tube service, even though it may amount to only a few minutes, is sufficient in many cases to secure an advanced delivery by carrier, and in effect means a gain of two or three hours. When this applies to mails due in the afternoon,

the securing of a delivery the same day means a gain to the business man or patron of the office of fifteen hours in the delivery of his mail.

Among the other advantages secured by the pneumatic-tube service is the continuous arrival of mails at the stations, allowing the handling of them by the office force in smaller quantities than when arriving by wagon or street-car conveyance, which can not be scheduled oftener than hourly without undertaking an enormous expense. The continuous arrival, therefore, means that a greater efficiency can be had from the clerical force, and that their work, being supplied continuously, can be covered by a less force than when the accumulated mails arrive at less frequent periods.

The gross revenue of the St. Louis post-office for the year ending June 30, 1900, was \$1,924,425 per annum, and the net amount turned over to the Department \$1,231,632. The local mail of the city of St. Louis amounts to 25.7 per cent of the whole, which indicates a net revenue on the local business of \$320,000 per annum. The cost of the proposed tube service will amount to about 34 per cent of the net profit on the local business. Comparing this with the present cost of the transportation service in the city, which amounts to \$54,352, it indicates, of course, a considerable increase, but it must be borne in mind that the transportation service has been conducted upon a very reasonable percentage of the total business and also upon about 17 per cent of the net profit on local business.

We forward herewith statistics of the amount of mail to be transported by the system of tube service recommended, and an examination of it will show—

That the mails to be transported daily by the tube between the general post-office and Union depot amounts to 221,150 letters outgoing and 219,300 incoming;

To the terminal station, located in Union depot, 8,000 letters outgoing and 4,850 incoming;

Between the general post-office and Relay depot, outgoing 146,900, 113,000 incoming;

Between the Vandeventer station and intermediate stations, 38,100 letters outgoing, 94,800 letters incoming;

Between the general post-office and Bremen station and intermediate stations, 90,350 outgoing and 92,200 incoming;

Between the general post-office and Arsenal station and intermediate stations, 39,350 outgoing and 104,000 incoming.

It is also stated by the local officials in this city that the rearrangement of the delivery and collection service by reason of the establishment of pneumatic-tube service the quantities of mails carried by pneumatic tube will be considerably increased.

The committee has considered the question of possible economies that may result from the establishment of pneumatic-tube service and the change in the facilities existing for the transportation of mails, but find it impossible to exactly state the amount of such economies. It is quite evident that the first-class mail can be transported by the tube service recommended, and that only the extreme bulky and heavy mails will need to be provided for by wagon or street-car conveyance. The wagon service to the Union depot at present is costing \$20,890 per annum, and it is safe to assume that 50 per cent of this expense could be discontinued by the tube service, and of the expense for street-car service, \$25,892, an equal percentage can be discontinued.

It is the expectation of Postmaster Baumhoff that the changes in the street-car service will enable him to rearrange the mileage discontinued in portions of the city where the present facilities are inadequate, using the tube terminals at the Vandeventer, Bremen, and Arsenal as the points from which the street postal-car service will receive and dispatch mails for the territory adjoining. It should be borne in mind that there is at present eighty-three letter-carrier branch post-offices, and the difficulty of supplying this number of branch post-offices is so great, they being distributed over a large territory, that a comparatively large mileage by street-car service must necessarily be retained. The mileage discontinued in the pneumatic-tube district, and which we regard as a saving, will in effect be used in other portions of the city as an improvement, thus taking the place of additional allowances for such improvements in the additional territories.

If it should be found that the entire mileage of pneumatic-tube service could not be allowed for the city of St. Louis in any one year, preference is expressed for the service connecting the general post-office with the Union and Relay depots as being the most important, the service connecting the general post-office and the Broadway branch post-offices north and south as the next most important.

Respectfully submitted,

J. M. MASTEN,

Chairman.

E. W. ALEXANDER.

STILL P. TAFT,

Superintendent Railway-Mail Service.

F. W. BAUMHOFF,

Postmaster.

ST. LOUIS, MO., September 9, 1900.

Hon. F. W. BAUMHOFF, *Postmaster.*

SIR: I report the following mail dispatched from this office via union station and relay depot, East St. Louis, Ill.; time dispatched; number of pouches and their weight; number of sacks and their weight, from midnight September 7 to midnight September 8.

OUTGOING MAIL.

Route.	Time leaves.	Pouches.	Pounds.	Sacks.	Pounds.	Total pounds.
Cin. and St. L., tr. 4	2.00 a. m.	3	143	41	1,568	1,711
Cin. and St. L., tr. 2	7.35 a. m.	1	4	17	241	245
Cin. and St. L., tr. 12	7.40 p. m.	7	180	49	2,130	2,310
Cin. and St. L., tr. 24 X	5.50 p. m.	5	5	5	15	20
Chi. and St. L., tr. 1 X	11.35 a. m.	3	5			5
Chi. and St. L., tr. 21 X	4.30 p. m.	5	5	4	23	28
Chi. and St. L., tr. 3	8.40 p. m.	13	454	32	1,609	2,063
St. L., La. and K. C., tr. 41	7.45 a. m.	2	33	6	232	265
St. L., La. and K. C., tr. 43	9.45 p. m.	3	98	12	784	882
Cleve. and St. L., tr. 8	7.05 a. m.	2	10	7	159	169
Cleve. and St. L., tr. 18 X	11.35 a. m.	7	42			42
Cleve. and St. L., tr. 122	10.15 a. m.	3	28			28
Cleve. and St. L., tr. 6	4.00 p. m.	1	12	2	79	91
St. L. and Pad., tr. 325	7.25 a. m.	5	130	60	1,710	1,840
St. L. and Pad., tr. 203 X	8.15 p. m.	14	188	47	1,434	1,622
St. L. and Pad., tr. 223	4.00 p. m.	2	64	5	125	189
Louis. and St. L., tr. 2	7.45 a. m.	2	33	14	240	273
Louis. and St. L., tr. 8 X	5.00 p. m.	1	1			1
Louis. and St. L., tr. 4	8.50 p. m.	5	99	9	387	486
Nash. and St. L., tr. 51	7.55 a. m.	3	92	34	1,448	1,540
Nash. and St. L., tr. 55 X	4.40 p. m.	1	2	1	5	7
Nash. and St. L., tr. 53	8.30 p. m.	6	242	47	2,689	2,931
St. L. and Jack., tr. 1	7.10 a. m.	2	45	18	666	711
St. L. and Jack., tr. 3	7.35 p. m.	3	143	33	1,751	1,894
St. L. and Jack., tr. 5	4.20 p. m.	4	1	4	108	109

OUTGOING MAIL—Continued.

Route.	Time leaves.	Pouches.	Pounds.	Sacks.	Pounds.	Total Pounds.
Tol., Frank. and St. L., tr. 4	7.40 a. m.	2	8	6	137	145
Tol., Frank. and St. L., tr. 6	6.50 p. m.	1	43	5	275	318
Pitts. and St. L., tr. 12	2.00 a. m.	3	123	30	1,234	1,387
Pitts. and St. L., tr. 20	8.10 a. m.	1	2	24	207	209
Pitts. and St. L., tr. 8	7.40 a. m.	1	2	2	79	81
Pitts. and St. L., tr. 2 X	12.35 p. m.	8	86	1	87	173
Pitts. and St. L., tr. 6 X	5.00 p. m.	3	1	3	16	17
Pitts. and St. L., tr. 10	7.45 p. m.	9	462	50	2,550	3,012
Tol. and St. L., tr. 6	2.00 a. m.	4	77	3	135	212
Tol. and St. L., tr. 24	6.55 a. m.	1	12	10	140	152
Det. and St. L., tr. 50	4.50 p. m.	2	63	2	69	132
Total		138	2,938	623	22,435	25,373

The following trains are dispatched through Union Station:

Route.	Time leaves.	Pouches.	Pounds.	Sacks.	Pounds.	Total pounds.
Rock Isd. and St. L., tr. 47	7.55 a. m.	2	17	7	283	300
Rock Isd. and St. L., tr. 49	8.20 p. m.	4	124	19	920	1,044
Burl. and St. L., tr. 1	2.00 a. m.	5	138	20	649	787
Burl. and St. L., tr. 3	7.15 a. m.	2	6	12	148	154
Burl. and St. L., tr. 5	12.05 p. m.	2	119	4	68	187
Burl. and St. L., tr. 23 X	1.00 p. m.	1	1			1
Burl. and St. L., tr. 7 X	7.40 p. m.			14	568	568
Burl. and St. L., tr. 15 X	8.35 p. m.	15	130	51	2,292	2,422
Cleve. and St. L., tr. 8	7.05 a. m.	2	10	7	159	169
Spring. and St. L., tr. 2	7.40 a. m.	5	75	11	137	212
Spring. and St. L., tr. 4	3.15 p. m.	2	34	3	81	115
Ill. Central, tr. 20 X	12.35 p. m.	3	36			36
St. L. and Sed., tr. 1	8.30 a. m.	1	73	4	88	161
M., K. and T., tr. 5 X	7.50 p. m.	9	47	9	133	180
St. L. and Tex., tr. 53	2.00 a. m.	8	291	42	1,925	2,216
St. L. and Col., tr. 57	7.30 a. m.	2	88	11	152	190
St. L. and Tex., tr. 51	1.50 p. m.	2	99	15	610	709
St. L. and Tex., tr. 55	7.45 p. m.	10	186	112	7,084	7,270
St. L. and Monett, tr. 1	8.20 a. m.	2	68	28	946	1,014
St. L. and Monett, tr. 5	8.25 p. m.	9	342	72	3,759	4,101
Frisco, tr. 13 X	1.00 p. m.	1				1
St. L. and Union, tr. 109	4.40 p. m.	1	22	4	43	65
St. L., Mob. and K. C., tr. 3	8.50 a. m.	2	44	12	345	389
St. L., Mob. and K. C., tr. 13	7.15 a. m.	7	19	12	134	153
St. L., Mob. and K. C., tr. 9	1.50 p. m.	3	168			168
St. L., Mob. and K. C., tr. 5	3.15 p. m.	2	2	8	276	278
St. L., Mob. and K. C., tr. 45 X	4.00 p. m.	1	2			2
St. L., Mob. and K. C., tr. 7 X	9.45 p. m.	5	5	17	459	464
St. L. and Coun. Bluffs, tr. 1	7.05 p. m.	7	386	93	4,761	5,147
St. L. and K. C., tr. 7	2.00 a. m.	7	356	107	4,042	4,398
St. L. and K. C., tr. 1	8.35 a. m.	2	64	44	1,388	1,452
St. L. and K. C., tr. 5 X	7.00 a. m.	1	2	2	14	16
St. L. and K. C., tr. 75 X	5.20 a. m.	3	1	3	61	62
St. L. and K. C., tr. 11	5.00 p. m.	1	10	2	54	64
St. L. and K. C., tr. 9	7.40 p. m.	13	799	100	3,670	4,469
St. L. and K. C., tr. 17	4.00 p. m.	2	32			32
Tol. and St. L., tr. 2	7.45 p. m.	8	424	49	2,013	2,437
Det. and St. L., tr. 18 X	11.35 p. m.	1	47	18	564	611
Chi. and St. L., tr. 45	8.10 a. m.	2	28	14	386	414
Chi. and St. L., tr. 7	11.05 p. m.	5	136	33	1,631	1,767
Cleve. and St. L., tr. 36	7.40 p. m.	2	41	6	92	133
Total		159	4,423	965	39,935	44,358

Mails for East St. Louis and National Stock Yards compiled.

Route.	Leaves.	Pouches.	Pounds.	Sacks.	Pounds.	Total pounds.
East St. Louis, Ill.	7.00 a. m.	1	7	1	17	24
Do	10.10 a. m.	1	15	1	14	29
Do	6.50 p. m.	1	7	1	15	22
Do	8.25 p. m.	1	10	1	7	17
National Stock Yards, Ill.	2.00 a. m.	1	4			4
Do	7.20 a. m.	1	7			7
Do	10.10 a. m.	1	14			14
Total		7	64	4	53	117

Following is count of mail received and dispatched September 8:

INCOMING MAIL.

	Pouches.	Weight.	Sacks.	Weight.
		<i>Pounds.</i>		<i>Pounds.</i>
Received from Union station	949	4,386	547	14,687
Received via Relay station	99	2,260	352	11,813
Received via Vandeventer station (railroad)	30	635	111	2,046
Received from Bremen and intermediate stations	12	1,057	3	168
Received from Arsenal station	17	1,370	1	37
Received from Annex	6	787	1	31
Received from Terminal station	9	97	1	19
Received from Cupples station	6	710		
Received from Wabash station (Vandeventer station collection, via Camp Jackson and Olive streets)	16	1,261	3	125
Total	1,144	12,563	1,019	28,926

MAIL FOR CITY.

Dispatched to Annex	16	746	57	925
Dispatched to Cupples	10	300	27	363
Dispatched to Terminal	6	160	18	213
Dispatched to Bremen and intermediate stations	36	894	73	1,891
Dispatched to Arsenal and intermediate stations	13	487	47	824
Dispatched to Produce	9	167	21	316
Dispatched to Wabash station and Camp Jackson	22	762	72	1,670
Total	112	3,516	315	6,202

When pneumatic-tube service is installed other carriers will be included in the proposed system, whose mail will increase these weights more than twice.

Respectfully,

WM. H. LAMB, *Superintendent.*

PHILADELPHIA, PA., *December 4, 1900.*

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The general committee have received from the Batcheller Pneumatic Tube Company, of Philadelphia, the detailed estimate upon which their proposition to construct the pneumatic-tube service in St. Louis was based, as submitted with the joint committee's report dated St. Louis, November 26.

In examining the estimates we are impressed with the necessity of reducing them in every possible way so as to bring down the amount of the yearly rental. To construct the power plant in the basement of the post-office building instead of in a separate building will save \$25,000 original outlay, which represents \$2,500 yearly rental on a 10 per cent basis, and as there is ample space in the basement of the post-office building we recommend that this plan be considered.

We also recommend that the preliminary expenses of the company as estimated for engineering, office expenses, freight charges, and royalties to Batcheller Pneumatic Tube Company be reduced from a 10 per cent annual basis to 5 per cent. The total of these items in the St. Louis estimates amounts to \$118,315, which at 5 per cent reduces the annual rental by \$5,916.

In considering this matter we have taken into account that there exists only the requirement to return a fair interest upon moneys advanced, there being no depreciation to be allowed for, as on machinery and tubing.

Very respectfully,

J. M. MASTEN, *Chairman.*

E. W. ALEXANDER,
General Committee.

*Estimate of cost of construction of proposed pneumatic-tube system, St. Louis, Mo., Batch-
eller Pneumatic Tube Company, Philadelphia, Pa.*

CENTRAL POWER STATION.

Ground	\$5,000	Switch boards	\$2,000
Building	10,000	Wiring and lighting	500
Chimney	3,000	Traveling crane	1,500
Engines and dynamos	71,500	Plumbing and gas fitting	250
Boilers	9,000	Repair equipment	2,500
Condensers	5,000	Transformers for lighting	440
Pumps	750	Furniture	100
Coal hoist	600	Telephone exchange	250
Ash hoist	300		
Foundations	3,000	Total	120,565
Steam water piping	4,875		

EQUIPMENT OF POSTAL STATIONS.

General post-office—		
2 transmitters, 8-inch		\$2,000.00
2 transmitters, 6-inch		1,800.00
2 receivers, 8-inch		1,400.00
2 receivers, 6-inch		1,200.00
3 compressors, 8-inch		7,500.00
3 compressors, 6-inch		6,000.00
Piping		4,050.00
6 foundations		1,500.00
Erection		1,050.00
Plumbing		300.00
Lockers		200.00
Repair of building		400.00
2 tanks, 8-inch		230.00
2 tanks, 6-inch		170.00
1 telephone		25.00
2 electric motors, 50-horsepower		2,600.00
1 electric motor, 30-horsepower		845.45
2 electric motors, 10-horsepower		916.66
1 electric motor, 5-horsepower		330.00
12 transformers		1,923.00
1 switch board		307.69
4 telephone cable heads		32.00
Total		34,779.80

Summary:

General post-office	34,779.80
Union depot	22,087.49
Relay depot	12,921.69
Cupples Street station	15,708.52
Barry Street station	15,953.81
Arsenal	10,080.31
Annex	15,176.85
Produce	16,079.42
Benton Street station	16,302.90
Bremen Street station	10,080.31
Compton Avenue station	16,281.09
Vandeventer street	15,953.81
Papin street	10,080.31
Total	211,486.31

LINE A (8-INCH).

13,460 feet iron tubing, at \$1.50	\$20,190.00
26 brass bends, at \$250	6,500.00
135 short lengths, at \$1	135.00
13 dutchmen, at \$75	975.00
27 drips, at \$32	864.00

6,925 feet of trench, at \$1.40.....	\$9,695.00
Entering tubes in post-office.....	1,000.00
2,375 square yards paving, granite, at \$1.80.....	4,275.00
708 square yards paving, brick, at \$1.80.....	1,274.40
312 square yards paving, rough block, at 75 cents.....	234.00
6,925 feet power cables, at 67 cents per foot trench.....	4,639.75
6,925 feet telephone, at 15.1 cents per foot trench.....	1,045.68
6,925 feet conduit, at 39 cents per foot trench.....	2,700.75
20 manholes, 2 by 4 by 5 feet (every 350 feet), at \$50.....	1,000.00
Total.....	<u>54,528.58</u>

LINE C (6-INCH).

5,860 feet iron tubing.....	\$6,592.50
16 brass bends.....	3,000.00
58 short lengths.....	43.50
8 dutchmen.....	448.00
12 drips.....	288.00
3,050 feet trench.....	3,202.50
Entering tube in post-office.....	750.00
1,528 square yards paving.....	2,062.80
3,050 feet power cables.....	2,043.50
3,050 feet telephone cables.....	460.55
3,050 feet conduits.....	1,189.50
Manholes.....	450.00
Total.....	<u>20,530.85</u>

COST OF LINES—SUMMARY.

A. Union depot.....	\$54,528.00
B. Relay depot.....	56,945.97
C. General post-office to Cupples.....	20,530.85
D. Cupples to Barry street.....	28,593.83
E. Barry street to arsenal.....	37,550.70
F. General post-office to annex.....	15,876.90
G. Annex to Produce.....	17,519.00
H. Produce to Benton.....	44,309.45
I. Benton to Bremen.....	30,109.00
J. Union depot to Compton.....	46,638.65
K. Compton to Vandeventer.....	27,394.80
L. Vandeventer to Terminal Papin street.....	34,406.65
Total.....	<u>411,403.80</u>

Installation of electrical equipment..... \$3,000.00

CONDUITS AND CABLES.

From power house to nearest station (2,640 feet), including excavation, filling, and paving trench..... \$4,324.45

ENGINEERING EXPENSES (ONE YEAR).

Chief engineer.....	\$3,000.00
First assistant.....	1,800.00
Second assistant.....	1,200.00
Three inspectors, at \$720.....	2,160.00
Chief draftsman.....	1,200.00
Six draftsmen (six months).....	1,160.00
One instrument.....	150.00
Drawing-room supplies.....	500.00
Traveling expenses.....	1,000.00
Total.....	<u>13,170.00</u>

OFFICE EXPENSES (ONE YEAR).

Bookkeeper.....	\$780.00
Stenographer.....	624.00
Office boy.....	203.00
Office rent.....	1,300.00
General expenses.....	600.00
Furniture.....	500.00
Total.....	<u>4,012.00</u>

COST OF CARRIERS.

120 8-inch carriers, at \$20.....	\$2,400.00
312 6-inch carriers, at \$15.....	4,860.00
Total.....	<u>7,260.00</u>

FREIGHT.

	Pounds.
98,250 feet tube, at 40 pounds.....	3,930,000
33,390 feet tube, at 60 pounds.....	2,003,400
24 transmitters, at 3,400 pounds.....	81,600
24 receivers, at 2,000 pounds.....	48,000
120 carriers, 8-inch, at 20 pounds.....	2,400
312 carriers, 6-inch, at 12 pounds.....	3,744
257 drips, at 400 pounds.....	102,800
257 surface boxes, at 50 pounds.....	12,850
Total.....	<u>6,187,866</u>
61,878.66 hundredweight, at \$0.33.....	\$20,419.96
Bridge toll (about 209 cars, at \$5).....	1,045.00
Total.....	<u>21,464.96</u>

SUMMARY OF COST OF CONSTRUCTION.

Central power station.....	\$120,565.00
Equipment of postal stations.....	211,486.31
Construction of lines.....	411,403.80
Installation of electrical equipment.....	3,000.00
Conduits from power house to nearest station.....	4,324.45
Engineering expenses—one year.....	13,170.00
Office expenses—one year.....	4,012.00
444 carriers.....	7,260.00
Freight on apparatus to St. Louis, Mo.....	21,464.96
10 per cent to the Batcheller Pneumatic Tube Co.....	79,668.65
Total.....	<u>876,355.17</u>
Cost of construction per mile.....	<u>70,108.41</u>

DECEMBER 4, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: The general committee on pneumatic-tube service has received an amended proposition from the American Pneumatic Service Company, of Boston, Mass., for the proposed tube service in St. Louis, Mo., which is herewith forwarded to you in connection with the final report on the St. Louis service, submitted by the joint committee from St. Louis under date of November 26.

The proposition as amended covers the cost of power to operate the tube service; but in other respects it is practically the same as their

original proposition. It names a price for the 12.78 miles of tube service, with the 10-inch tube, of \$188,283 per annum, including power, against the first price named of \$178,400 per annum, and the Post-Office Department to furnish power.

The propositions for 8-inch and 6-inch systems amounts to \$198,670 per annum, some thousands above the estimates for 10-inch system.

Very respectfully,

J. M. MASTEN, *Chairman,*
E. W. ALEXANDER,
General Committee.

AMERICAN PNEUMATIC SERVICE COMPANY,
Boston, November 26, 1900.

J. M. MASTEN, Esq.,
Chairman of Post-office Commission, Washington, D. C.

DEAR SIR: We fully intended to have forwarded to you to-night the estimates conbining operating expenses for the cities of St. Louis and Cincinnati, but we were delayed in receiving estimates for the cost of power. They were received, however, late this afternoon, and we will forward at once to-morrow morning these estimates to you, care of the above address. Hoping this will be satisfactory, we are,

Yours, very truly,

W. E. L. DILLAWAY.

Estimate and cost of power, 10-inch pneumatic-tube system.

	Horse-power.	Cost.
Main post-office to Union station	30	\$2,850.00
Main post-office to Relay station	57	5,415.00
Bremen station to Arsenal station	209	19,855.00
Union station to Vandeventer avenue.....	94	8,930.00
Total.....		37,050.00

The above to be added to the estimate of general operating expenses.

Estimate of general operating expenses, 10-inch pneumatic-tube system, using wheel carrier.

[Main post-office to Union station; main post-office to Relay station; Bremen station to Arsenal station; Union station to Vandeventer avenue. Operating hours, 4 a. m. to 11 p. m.]

1 superintendent	\$900.00
3 repair men, at \$780	2,340.00
2 inspectors, at \$600	1,200.00
3 substitutes, at \$600	1,800.00
Rent, repair shop	600.00
Power, repair shop	450.00
Engineers, at \$780 (3 at main post-office, 3 at Union station, 2 at Produce station, 2 at Cupples station, 2 at Vandeventer avenue)	12,060.00
Telephone service, 8 lines.....	1,200.00
Operating expenses:	
Main post-office to Union station	14,828.00
Main post-office to Relay station	17,584.00
Bremen station to Arsenal station	73,460.00
Union station to Vandeventer avenue	24,811.00
	151,233.00

NOTE.—This estimate does not include taxes and insurance.

Estimate of cost of construction, 10-inch pneumatic-tube system, main post-office to Union station.

10,000 feet 10-inch tube, at \$1.12	\$11,200.00	
10,000 feet 10-inch tube laid, at \$0.30	3,000.00	
5,000 cubic yards excavation, at \$2	10,000.00	
5 sets of bends, at \$170 per set	850.00	
Machine work	300.00	
		\$25,350.00
Terminals:		
2 transmitters, at \$1,000	2,000.00	
2 open receivers, at \$500	1,000.00	
70 carriers, at \$25	1,750.00	
		4,750.00
		30,100.00
Power plant:		
2 motors, at \$1,400	2,800.00	
2 compressors, at \$2,500	5,000.00	
Foundations	1,600.00	
Air piping	3,000.00	
Air tank and fittings	750.00	
		13,150.00
		43,250.00
Engineering expense		1,000.00
Freight, cartage, etc		2,000.00
		46,250.00
10 per cent for contingencies		4,625.00
		50,875.00

Estimated operating expenses, 10-inch pneumatic-tube system, main post-office to Union station.

Four terminal attendants, at \$780	\$3,120
Wear and tear account, 70 carriers per month, at \$2.10, \$147, per year	1,764
Rent of room at station	1,200
Heat and light for room at station	600
Depreciation on pipe line, 5 per cent	1,267
Depreciation on power plant, 10 per cent	1,790
Interest on investment, 10 per cent	5,087
Total	14,828

Estimate of cost of construction, 10-inch pneumatic-tube system, main post-office to Relay station, East St. Louis.

[Distance 8,800 feet.]

17,600 feet of tube, at \$1.12	\$19,712	
17,600 feet of tube laid, at \$0.30	5,280	
20 sets of bends, at \$170 complete	3,400	
1,000 cubic yards excavation, at \$2	2,000	
2,600 special hangers for tunnel and bridge, at \$3	7,800	
Extra cost getting pipe into tunnel and bridge	5,000	
Machine work	1,000	
		\$44,192
Terminals:		
2 transmitters, at \$1,000 each	2,000	
2 open receivers, at \$500 each	1,000	
120 carriers, at \$25 each	3,000	
		6,000
		50,192

Power plant:	
2 motors, at \$1,400 each	\$2,800
2 compressors, at \$2,500 each	5,000
Foundations	1,600
Air piping	3,000
Air tank and fittings	750
	\$13,150
Engineering expense	63,342
Freight, cartage, etc	900
	2,250
	66,492
10 per cent for contingencies	6,650
	73,142

Estimated operating expenses, 10-inch pneumatic-tube system, main post-office to Relay station, East St. Louis.

Four terminal attendants, at \$780	\$3,120
Wear and tear account, 120 carriers at \$2.10 per month, \$252, per year	3,024
Depreciation on pipe line, 5 per cent	2,210
Depreciation on power plant, 10 per cent	1,915
Interest on investment, 10 per cent	7,315
	17,584

Estimate of cost of construction, 10-inch pneumatic-tube system, Bremen station to Arsenal station. Stations at Produce station, post-office annex, main post-office, and Cupples station.

[Distance, 32,610 feet.]

65,220 feet of tube, at \$1.12	\$73,046
65,220 feet of tube laid, at 30 cents	19,566
30,000 cubic yards excavation, at \$2	60,000
40 sets bends, at \$170 per set	6,800
Machine work	2,000
	\$161,412

Terminals:	
Ten transmitters, at \$1,000 each	10,000
Ten open receivers, at \$500 each	5,000
Four hundred and fifty carriers, at \$25 each	11,250
	26,250
	187,662

Power plants:	
Ten motors, at \$1,400 each	14,000
Ten compressors, at \$2,500 each	25,000
Foundations	8,000
Air piping	15,000
Air tanks and fittings	3,750
	65,750

	253,412
Engineering expense	3,500
Freight, cartage, etc	9,000
	265,912

10 per cent for contingencies	26,591
	292,503
Total	

Estimated operating expenses, 10-inch pneumatic-tube system, Bremen station to Arsenal station. Stations at Produce station, post-office annex, main post-office, and Cupples station.

Twenty terminal attendants, at \$780	\$15,600
Wear-and-tear account, 450 carriers, at \$2.10 per month, \$945, per year	11,340
Depreciation on pipe line, 5 per cent	8,070
Depreciation on power plant, 10 per cent	9,200
Interest on investment, 10 per cent	29,250
Total	73,460

Estimate of cost of construction, 10-inch pneumatic-tube system, Union station to Vandeventer avenue and railroad station.

[Distance, 14,750 feet.]

29,500 feet of tube, at \$1.12	\$33,040
29,500 feet of tube laid, at 30 cents	8,850
14,000 cubic yards excavation, at \$2	28,000
10 sets bends, at \$170 per set	1,700
Machine work	600
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	\$72,190
Engineering expense	1,500
Carting, freight, etc	4,500
	<hr/>
	78,190
Terminals:	
2 transmitters, at \$1,000 each	2,000
2 open receivers, at \$500 each	1,000
200 carriers, at \$25 each	5,000
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	8,000
	<hr/>
	86,190
Power plant:	
2 motors, at \$1,400 each	2,800
2 compressors, at \$2,500 each	5,000
Foundations	1,600
Air piping	3,000
Air tank and fittings	750
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	13,150
	<hr/>
	99,340
10 per cent for contingencies	9,934
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Total	109,274

Estimated operating expenses 10-inch pneumatic-tube system, Union station to Vandeventer avenue and railroad station.

[Distance, 14,750 feet.]

Four terminal attendants, at \$780	\$3,120
Wear and tear account, 200 carriers, at \$2.10 per month, \$420, per year	5,040
Depreciation on pipe line, 5 per cent	3,609
Depreciation on power plant, 10 per cent	2,115
Interest on investment, 10 per cent	10,927
	<hr/>
Total	24,811

Estimate and cost of power, 6 and 8 inch pneumatic-tube systems.

	Horse-power.	Cost.
Main post-office to Union station (8-inch)	43.2	\$4,104
Main post-office to Relay station (8-inch)	68.0	6,460
Bremen station to Arsenal station (6-inch)	308.0	29,260
Union station to Vandeventer avenue (6-inch)	111.0	10,545
Total.....		50,369

The above to be added to the estimate of general operating expenses.

Estimate of general operating expenses pneumatic-tube system, using sliding carrier.

- Main post-office to Union station (8-inch).
- Main post-office to Relay station (8-inch).
- Bremen station to Arsenal station (6-inch).
- Union station to Vandeventer avenue (6-inch).

[Operating hours, 4 a. m. to 11 p. m.]

One superintendent	\$900
Three repair men, at \$780	2,340
Two inspectors, at \$600	1,200
Three substitutes, at \$600	1,800
Rent repair shop	600
Power repair shop	450
Engineers at \$780:	
Three at main post-office	}
Three at Union station	
Two at Produce station	
Two at Cupples station	
Two at Vandeventer avenue	
Telephone service, eight lines	1,200
Operating expenses:	
Main post-office to Union station	14,372
Main post-office to Relay station	21,155
Bremen station to Arsenal station	68,649
Union station to Vandeventer avenue	23,575
Total.....	148,301

NOTE.—This estimate does not include taxes and insurance.

Estimate of cost of construction 8-inch pneumatic-tube system, main post-office to Union station.

[Distance, 5,000 feet.]

10,000 feet 8-inch tube, at \$1.35	\$13,500
10,000 feet 8-inch tube laid, at 30 cents	3,000
5,000 cubic yards excavation, at \$2	10,000
5 sets of bends, at \$300 per set	1,500
20 reducers, at \$50	1,000
Machine work	300
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	\$29,300
Terminals:	
2 transmitters, at \$800	1,600
1 closed receiver, at \$800	800
1 open receiver, at \$400	400
70 carriers, at \$18	1,260
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	4,060

Power plant:		
2 compressors, at \$2,500	\$5,000	
Foundations	1,600	
Piping, steam and air	3,000	
Air tank and fittings	750	
		\$10,350
		43,710
Engineering expense	500	
Freight, cartage, etc	1,500	
		45,710
10 per cent for contingencies		4,571
		50,281

Estimated operating expenses 8-inch pneumatic-tube system, main post-office to Union station.

[Distance, 5,000 feet.]

Four terminal attendants, at \$780	\$3,120
Wear and tear account 70 carriers, at \$3.95 per month, \$276.50 per year	3,318
Depreciation on pipe line, 5 per cent	1,465
Depreciation on power plant, 10 per cent	1,441
Interest on investment, 10 per cent	5,028
	14,372

Estimate of cost of construction 8-inch pneumatic-tube system, main post-office to relay station, East St. Louis.

[Distance, 8,800 feet.]

17,600 feet of 8-inch tube, at \$1.35	\$23,760
17,600 feet of 8-inch tube laid, at 30 cents	5,280
20 sets of bends, at \$300 complete	6,000
1,000 cubic yards excavation, at \$2	2,000
80 reducers, at \$50	4,000
2,600 special hangers for tunnel and bridge, at \$3	7,800
Extra cost getting pipe into tunnel and bridge	5,000
Machine work	1,000
	\$54,840

Terminals:

2 transmitters, at \$800 each	1,600
1 closed receiver	800
1 open receiver	400
120 carriers, at \$18	2,160
	4,960
	59,800

Power plants:

2 compressors, at \$2,500 each	5,000
Foundations	1,600
Piping, steam and air	3,000
Air tank and fittings	750
	10,350

	70,150
Engineering expense	1,000
Freight, cartage, etc	2,250
	73,400
10 per cent for contingencies	7,340
	80,740

Estimated operating expenses 8-inch pneumatic-tube system, main post-office to relay station, East St. Louis.

[Distance, 8,800 feet.]

Four terminal attendants, at \$780	\$3,120
Wear and tear account 120 carriers, per month at \$3.95, \$474 per year	5,688
Depreciation on pipe line, 5 per cent.....	2,742
Depreciation on power plant, 10 per cent.....	1,531
Interest on investment, 10 per cent.....	8,074
Total	21,155

Estimate of cost of construction 6-inch pneumatic-tube system, Bremen station to Arsenal station, stations at Produce station, post-office annex, main post-office, and Cupples station.

[Distance, 32,610 feet.]

65,220 feet 6-inch tube, at \$1	\$65,220
65,220 feet 6-inch tube laid, at 25 cents.....	16,305
20,000 cubic yards excavation, at \$2	40,000
1,000 feet brass bends, at \$10 per foot.....	10,000
152 reducers, at \$25.....	3,800
Machine work.....	2,000
	<hr/>
	\$137,325
Terminals:	
10 transmitters, at \$500 each.....	5,000
5 open receivers, at \$300 each	1,500
5 closed receivers, at \$500 each.....	2,500
450 carriers, at \$15 each.....	6,750
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	15,750
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	153,075
Power plants:	
10 compressors, at \$2,500 each.....	25,000
Foundations	6,000
Steam and air piping	12,500
Air tanks and fittings.....	3,000
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	46,500
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	199,575
Engineering expense	2,500
Freight, cartage, etc	9,000
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	211,075
10 per cent for contingencies	21,107
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Total	232,182

Estimated operating expenses 6-inch pneumatic-tube system, Bremen station to Arsenal station, stations at Produce station, post-office annex, main post-office, and Cupples station.

[Distance, 32,610 feet.]

Twenty terminal attendants, at \$780	\$15,600
Wear and tear account 450 carriers, at \$3.10 per month, \$1,395 per year.....	16,740
Depreciation on pipe line, 5 per cent.....	6,866
Depreciation on power plant, 10 per cent.....	6,225
Interest on investment, 10 per cent.....	23,218
	<hr/>
Total	68,649

Estimate of cost of construction 6-inch pneumatic-tube system, Union station to Vandeventer avenue and railroad station.

[Distance, 14,750 feet.]

29,500 feet of 6-inch tube, at \$1	\$29,500
29,500 feet of 6-inch tube laid, at 25 cents	7,375
9,000 cubic yards excavation, at \$2	18,000
200 brass bends, at \$10 per foot	2,000
32 reducers, at \$25	800
Machine work	600
	\$58,275
Engineering expense	1,000
Carting, freight, etc	4,500
	63,775
Terminals:	
2 transmitters, at \$500 each	1,000
1 open receiver	400
1 closed receiver	500
200 carriers, at \$15	3,000
	4,900
	68,675
Power plant:	
2 compressors, at \$2,500 each	5,000
Foundations	1,200
Piping, steam, and air	3,000
Air tank and fittings	600
	9,800
	78,475
10 per cent for contingencies	7,847
Total	86,322

Estimated operating expenses 6-inch pneumatic-tube system Union station to Vandeventer avenue and railroad station.

[Distance 14,750 feet.]

Four terminal attendants, at \$780	\$3,120
Wear-and-tear account, 200 carriers, at \$3.10 per month, \$620 per year	7,440
Depreciation on pipe line, 5 per cent	2,913
Depreciation on power plant, 10 per cent	1,470
Interest on investment, 10 per cent	8,632
	23,575

NEW ORLEANS.

NEW ORLEANS POST-OFFICE,

OFFICE OF THE POSTMASTER,

New Orleans, La., October 16, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: In accordance with the general instructions contained in Postmaster-General's Order, No. 989, the joint committee on pneumatic-tube service proposed for the city of New Orleans, composed of Hon. J. R. G. Pitkin, postmaster; Col. L. M. Terrell, superintendent of the

Railway Mail Service; the local committee, and the general committee, J. M. Masten, chairman, E. W. Alexander, and J. A. Montgomery, met in the postmaster's room Monday forenoon, October 15, and proceeded to the consideration of the entire subject, including the statistics of mail to be transmitted and plans outlined, and later visited the several points in the city contemplated to be connected with the general post-office by the tube service.

As represented in the preliminary report of the local committee to you, under date of September 13, 1900, there is a new post-office building proposed for New Orleans, for which we are informed an appropriation has already been passed upon by the United States Senate Post-Office Committee, and will be further urged upon both Houses of Congress the coming session, and the Representatives of the State of Louisiana in Congress express themselves as assured of its being favorably acted upon. It is a fact that the present post-office quarters are inadequate and unsuitable.

The railroad stations (six in number) used by the various lines entering New Orleans are temporary structures, with the single exception of the depot of the Illinois Central and the Yazoo and Mississippi Valley railroads, and changes in their locations are contemplated previous to permanent buildings being erected.

The changes contemplated in the location of the post-office and several railroad stations preclude the possibility of a pneumatic-tube system being constructed at this time which will not require in the near future extensive rebuilding at nearly as great an expense as the cost of first construction.

In addition to these facts we find that the largest and most important mails coming to the city, the New York, Eastern, and European mails, are exchanged at the Louisville and Nashville Railroad depot, a distance of thirteen one-hundredths of a mile from the general post-office and only three minutes drive, making it impossible to improve on the time in which those mails are now handled.

The great business of the city of New Orleans, its banking, brokerage, and commission, the wholesale and jobbing districts, the board of trade, and the cotton, sugar, and rice exchanges, etc., are now situated within a radius of seven blocks of the present location of the general post-office, and will be within half as many blocks of the location commonly accepted for the new office.

The branch post-offices in this city are six in number and are situated mainly within the residence districts of the city, and serve the social and small retail business interests. The three more important ones, stations C, D, and E were examined with a view to determine their importance and the advisability of connecting them with the general post-office by tube service, but this examination developed the fact that their importance does not justify the expense of providing so costly a service, at the present time. The statistics of mail exchanged is shown in the following statement, being the average of three days' mail, counted upon the 20th, 21st, and 22d of September last, and the revenue of each for the year ending June 30, 1900:

	Received.	Dis- patched.	Revenue.
Station C	2,700	450	\$8,946.47
Station D	1,100	200	3,772.00
Station E	2,100	400	11,502.28

These stations are now connected with the general post-office by wagon service, receiving and dispatching five mails each way and receiving an additional mail by letter carrier at 2 p. m. each week day.

The distance from the general post-office to Station C is 2.59 miles; to Station E, 1.17 miles, and to Station D, 1.74 miles.

The service to the railroads is now performed by regulation wagon service, contracted for at a cost (together with the branch post-office service) of \$9,630 per annum, which contract extends to June 30, 1902. The frequency is as follows:

	Distance.	Round trips (weekly).	Running time.	Letter mail (daily).
	<i>Miles.</i>		<i>Minutes.</i>	
Louisville and Nashville Railroad.....	0.13	33	10	34,000
Texas and Pacific.....	.98	28	20	19,000
Southern Pacific.....	.85	35	20	22,500
Illinois Central.....	1.10	56	20	40,000
New Orleans and Northeastern.....	1.54	27	25	1,500
New Orleans, Fort Jackson and Grand Isle.....	.79	12	45	1,000

The committee were waited upon to-day by committees of the board of trade and cotton exchange and principal business interests, who stated that they desired to impress upon the committee the fact that the different business interests wanted the improvement in the mail service which they believed would be the result of the introduction of a pneumatic-tube service in this city. They represented that many difficulties in the way of construction of such a system had been corrected in recent years by the improved drainage system which has been introduced, which lowered the water line in the city to about 10 feet below the surface, and that within the past year the telephone and electric-lighting wires had been placed under ground with perfect success, at a depth of from 4 to 6 feet.

They were sanguine in their claims that a great development of trade and business done in New Orleans would be manifest within the coming few years, and that the population would be increased from the present 287,000 to 600,000 or 700,000.

It is our belief, however, despite these representations in which we have great faith, that a recommendation for a pneumatic-tube service in New Orleans would be unwise, and we therefore jointly recommend to you that New Orleans be omitted from the cities under examination for such service for the present and that further consideration of the subject will be justified when the more permanent locations of post-office and railroad depots have been determined.

Very respectfully,

J. M. MASTEN, *Chairman,*

J. R. G. PITKIN, *Postmaster,*

L. M. TERRELL, *Superintendent Railway Mail Service,*

J. A. MONTGOMERY,

E. W. ALEXANDER,

Joint Committee.

NEW ORLEANS POST-OFFICE,
OFFICE OF THE POSTMASTER,
September 22, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

DEAR SIR: I had proposed to go North in relation to the pneumatic-tube proposition, pursuant to your suggestion of the 14th instant and request of the 17th instant, and so wrote Superintendent Terrell at Atlanta. But for three days past, owing to our pitiless September heat and my activity in the campaign, I am suffering from an illness which constrains me to forbear wholly from such activity and to remain at home. I conceive that this explanation is due to you of the one reason that deters me from compliance with your wish. I send you herewith a diagram illustrating the distance between the general post-office and the railway and postal stations; also, a statement of the average number of pieces of first-class mail matter from the general post-office to such stations; also, a statement of the average number of pieces of first-class matter from the postal stations to the general post-office.

Very respectfully, yours,

J. R. G. PITKIN,
Postmaster.

Average number of letters dispatched from the general post-office to postal stations daily:

To Station A	560
To Station B	1,100
To Station C	2,700
To Station D	1,100
To Station E	2,100
To Station F	85
Total	7,645

Average number of letters dispatched from postal stations to the general post-office daily:

From Station A	500
From Station B	450
From Station C	450
From Station D	200
From Station E	400
From Station F	250
Total	2,250

Average number of letters dispatched from the general post-office to railroad stations daily:

To Louisville and Nashville Railroad	34,000
To Illinois Central Railroad	40,000
To Southern Pacific	22,500
To Texas and Pacific	19,000
To Queen and Crescent	15,000
To New Orleans, Fort Jackson and Grand Isle	1,500
Total	132,000

NEW ORLEANS POST-OFFICE,
OFFICE OF THE POSTMASTER,
September 13, 1900.

HON. W. S. SHALLENBERGER,
Second Assistant Postmaster-General, Washington, D. C.

DEAR SIR: Acting under a common instruction from your hand, based upon order No. 989, issued on the 13th ultimo by the Postmaster-General in relation to pneumatic-tube service, the undersigned local committee, upon the arrival of the division superintendent of the Railway Mail Service, one of its members, have instituted due investigation and have the honor to report:

That by far the largest volume of first-class mail matter—as also of second and third class—arriving at New Orleans is by the Louisville and Nashville Railroad, whose terminal station is on the river levee and but two ordinary squares eastward from the custom-house building wherein the post-office is located.

That the Illinois Central Railroad and Yazoo and Mississippi Valley Railroad have a common terminal westward of the post-office on the corner of Howard avenue and South Rampart street; the former highway being the fourteenth from Canal street, on which is the post-office, and the latter thirteenth from the river. Tube service would thus involve one angle, if not more.

That the Southern Pacific Railway station is on the levee thirteen blocks northeastward from the post-office; Texas and Pacific Railway station is also on the river front sixteen blocks southward from the post-office, and the New Orleans and Northeastern Railroad station, also on the river front, twenty blocks northward from the post-office. The map herewith will better exhibit the locations. Two minor railways, the East Louisiana and the Fort Jackson, are inconsiderable in reach and service.

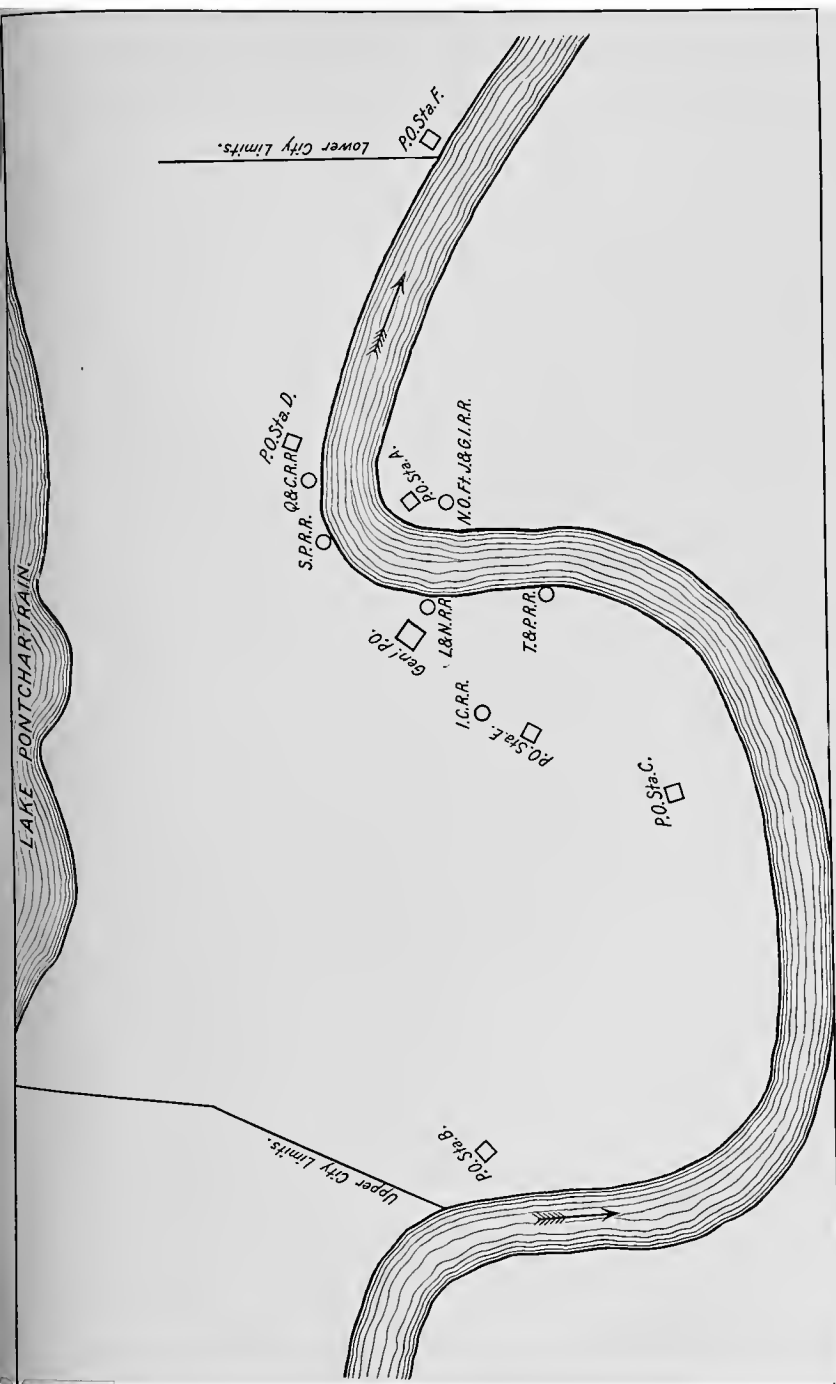
Upon a full consideration of the question there appears to be far from enough transmission of matter to and from the several railway stations to commend at this period expenditure for tube service; and, as already remarked, the carrier of the largest volume of mail matter brings it within two squares of the post-office; that the post-office has six stations and ten substations, and of the former the largest business is at Station E, but it is readily served and not of sufficient importance to warrant tube service; that, furthermore, a bill has been favorably reported to the Senate for an appropriation of \$1,250,000 for or toward the erection of a new post-office building at some different locality in this city, by reason of a long urgent desire of the people here in that regard and of the present dark and unwholesome quarters, converted in 1862 from a part of the warehouse floor of the custom-house building for postal uses. Senator McEnery, who has the bill in charge, informs the postmaster that the Lower House will, as he believes, consider the question promptly of a new structure at the coming session, and that the appropriation will probably pass both bodies before adjournment.

In view of these recited facts, the undersigned local committee conceive it to be its duty to submit that no necessity appears for a pneumatic-tube service for the transmission of mails at New Orleans under present conditions.

Very respectfully, yours,

L. M. TERRELL,
Superintendent Railway Mail Service.

J. R. G. PITKIN,
Postmaster.



DISTANCE FROM GENERAL POST-OFFICE TO—

DENVER.

POST-OFFICE,

Denver, Colo., October 27, 1900.

HON. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: In accordance with the direct instructions from yourself and the general instructions contained in Postmaster-General's order No. 989, the committee on pneumatic-tube service proposed for the city of Denver met in this city and have considered the subject thoroughly as it applied to Denver, and beg to report that its establishment in Denver is unnecessary under present conditions.

The following facts in regard to the mail service of this city may be considered as of interest in connection with the view expressed above.

The population of the city as shown by the 1900 census is 133,000, and the mail service is performed from one general post-office and three branch post-office stations. The general post-office is located on Sixteenth and Arapahoe streets, in almost the exact center of the business district, which extends from Fourteenth to Nineteenth streets, inclusive, and from Broadway to Wazee streets, approximately a distance one-half mile wide by 1 mile in length. The great bulk of the business mail originates within the confines of this district, estimated to be from 85 to 90 per cent of the whole. The three branch offices are located at nearly equal distances from the general post-office—Highlands, 1.47 miles northwest with 11 carriers; Fortieth street station, 2.29 miles north with 10 carriers; and South Denver, 2.61 miles south with 10 carriers. The transportation service between the general post-office and the stations is performed by closed-pouch service by the Denver City Tramway Company (electric), and three trips each way are made to each station, except to South Denver where there are four trips each way, and the time in transit is about twenty minutes to each one. There are two delivery trips by carriers from each station and the collections are made by the delivery carriers. In the general post-office there are 4 and 5 delivery trips and 7 collection trips in the central business district named above, which service is performed by 59 letter carriers.

All the trains arriving and leaving Denver use the Union depot, which is located a distance of 0.57 mile from the general post-office, and the service thereto is performed by a contractor employed by the railroad companies. No service has ever been called for which has not been promptly furnished by him. The running time between the two points is easily made in ten minutes. The streets are smoothly paved with asphaltum; they are wide and not crowded with traffic, on account of so many parallel streets being available, all finely paved.

There is a daily average of about 92,000 pieces of first-class mail dispatched to the Union depot and about 78,000 received.

It is not a fact that improvements in the mail service are not needed and can not be inaugurated, but it is believed that these improvements should take another form than pneumatic tubes. For instance, the collection service can be improved by the establishment of a street-railway post-office service, such as is in operation in St. Louis, which would not only transport the mails to and from the stations, but would

also be used here to collect from the street letter boxes, at important street corners, where collectors crossing the car routes, as well as the public, will deposit mails to be taken up by railway post-office clerks. The arrival at the post-office of a large percentage of the mail could be facilitated and advance railroad connections made. In many cases such advance connections will make a difference of twenty-four hours in its delivery.

There is also a great necessity for the establishment of an additional branch post-office in the Capitol Hill district, in an easterly direction, about 2 miles from the general post-office, where some 10 or 12 carriers would be located, securing better service than can be had from the general post-office on account of the distance. That district is also building up rapidly and the additional mail facilities are becoming imperative.

The street railway post-office service can be used to supply the additional station at Capitol Hill.

It is recommended that the street railway post-office service and the additional station be taken up by your office and that of the First Assistant Postmaster-General as soon as consistent.

In view of these facts and because of the large expense entailed in its construction and operation, we do not deem it consistent to recommend the establishment of the pneumatic-tube service in this city at the present time, especially as the service can be improved upon the lines mentioned at much less cost.

A blue print or map of the points named is inclosed herewith, and in connection with this report we wish to file the inclosed statement submitted by Postmaster Twombly, dated September 15, 1900.

Very respectfully,

JOHN C. TWOMBLY,
Postmaster.

STILL P. TAFT,
Superintendent Railway Mail Service.

J. M. MASTEN,
Chairman.

J. A. MONTGOMERY.
E. W. ALEXANDER.

POST-OFFICE,
Denver, Colo., September 15, 1900.

To the General Committee on Pneumatic-Tube Service:

In connection with the accompanying map or drawing we desire to submit the following data as to the advisability of the installation of pneumatic-tube service at this point:

The map shows the lines as follows:

	Miles.
Post-office to South Denver station.....	2. 61
Post-office to Highlands station.....	1. 47
Post-office to Fortieth street station.....	2. 29
Post-office to Union depot.....	. 57

The routes of the several lines are laid in the following streets:

South Denver station, commencing at the corner of Arapahoe street, up Sixteenth street to Broadway, and along that street to 266 South Broadway.

Highlands station, commencing at corner of Arapahoe street, down Sixteenth street to West Thirtieth avenue, to Gallup avenue, and along that street to 2943 Gallup, with shut offs at the intersection of Market and Wynkoop streets.

Fortieth street station, commencing on Highlands station line at intersection of Sixteenth and Market streets, and along the latter street to 3851 Market.

Union depot, commencing on Highlands station line at intersection of Sixteenth and Wynkoop streets, and along the latter street to office of transfer clerk in Union depot building.

In connection with the distance above given it should be stated that the actual mileage of tubing necessary to cover the service as outlined is, 2.61 miles to South Denver station, 1.47 miles to Highlands station, 2.06 miles to Fortieth street station (from intersection of Sixteenth and Market streets), and 0.13 mile to Union depot (from intersection of Sixteenth and Wynkoop streets). This mileage is not absolutely correct, perhaps, it being estimated from measurements made on a map drawn 500 feet to the inch.

In the matter of building the tubes I respectfully invite your attention to the following:

For the South Denver station line, all of Sixteenth street, and Broadway, as far as Ninth avenue, are paved with asphaltum. On Broadway, between Sixth and Seventh avenues, the street crosses Cherry Creek on an elevated bridge. From Ninth avenue to the location of the station (excepting the above-mentioned bridge) there is no paving.

For the Highlands station line, Sixteenth to Wazee street, is paved with asphaltum; from Wazee street to Platte street is a viaduct from which the tube can be suspended; from Platte street to location of station there is no paving.

For the Fortieth Street station, Market street, from Sixteenth to Nineteenth, is paved with stone; from Nineteenth street to location of station, no paving.

For the Union depot line, Wynkoop street to location of station is paved with stone.

As to the necessity for pneumatic-tube service to the above-mentioned points, we have to say that we do not believe that the quantity of mail to be advanced would warrant its construction to either South Denver station or Highlands station. The larger part (at least 90 per cent) of the first-class mail to and from both these stations is social, rather than business, in its nature. There is vastly more need of the service to the Fortieth Street station, for the reason that the station is located in the vicinity of the smelters, railroad shops, and the largest manufacturing interests in the city. All three of these stations are at present supplied by closed pouches via electric-car lines, there being four exchanges on week days with South Denver, and three each with Highlands and Fortieth street. Under the present arrangement we are compelled to dispatch mails from this office one and one-quarter hours prior to departure of carriers, in order to give limited clerical forces proper time and opportunity to make necessary distribution. A pneumatic-tube service would, of course, be of great advantage in this respect, as it would admit of the prompt delivery of all first-class mail which was in the main office up to the departing at schedule time of all carriers at stations.

The most important line is, of course, that to the Union depot, as that would admit of the dispatch of outgoing mails up to practically the minute of departure of trains. It is a conservative estimate to say that at least 5,000 letters daily could be thus advanced. With our present wagon service our mails are closed on an average of thirty minutes prior to schedule departure of trains, whereas by pneumatic tube matter could be dispatched up to five minutes before schedule time of leaving.

At certain hours of the day incoming matter could also be materially advanced in delivery, as it would be possible with pneumatic tubes to get it in the hands of the carriers, when by wagon it would not reach the office in season. However, we do not understand that this pneumatic-tube service would discontinue the electric-car service to stations or the wagon service to Union depot, as it would not be practicable to dispatch the bulky and heavy paper mails by pneumatic tube. As we understand it, this service simply contemplates the handling of such matter as it is impossible to handle in the ordinary way. It is a question for the general committee to determine whether the needs of the service at this point will warrant the expense of construction and maintenance of pneumatic-tube service.

We are not posted on the cost of construction and are not able to give any data in that connection.

Respectfully submitted.

JOHN C. TWOMBLY,
Postmaster.

SAN FRANCISCO.

RAILWAY-MAIL SERVICE,
OFFICE OF SUPERINTENDENT, EIGHTH DIVISION,
San Francisco, Cal., October 25, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: Acting under the general instructions conveyed in Postmaster-General's Order No. 989, the committee on pneumatic-tube service for the city of San Francisco, Cal., composed of the local committee, Hon. W. W. Montague, postmaster, and Mr. H. P. Thrall, superintendent Railway-Mail Service, and the general committee, J. M. Masten, chairman, J. A. Montgomery, and E. W. Alexander, met in this city on Monday, October 22, and proceeded to an examination of the various matters involved in the investigation of the subject, and now have the honor to report:

The city of San Francisco has a population, as determined by the census of 1900, of 342,782 people, and the post-office did a postal business for the year ending June 30, 1900, of \$1,024,575, gross, and turned over to the Government the sum of \$548,460.92 net revenue.

The mail service is now performed at a great disadvantage, inasmuch as the quarters in the old Government building are totally inadequate, and the new building under construction at the present time and located at Seventh and Mission streets will probably not be completed much within a period of two years—possibly the main floor may be finished sooner, owing to the necessity for a proper post-office building, and because the Treasury Department is desirous of securing the vacating of the present main office building in order that the site may be used for the erection of a new custom-house, which is also badly needed. Under these circumstances, space for the handling of the outgoing mail, as well as for carrier service for the serving of the large business districts of the wharves and shipping interests, has been secured in a separate building owned by the State and under control of the State harbor commissioners at the foot of Market street, at the wharf where the ferries for all the trains of the Southern Pacific, the Santa Fe, and all other railroads arrive and depart, except the trains of the Coast Division of the Southern Pacific Railway, known as Route 176002, which run to Third and Townsend streets, opposite the site of Branch Station E. The branch at the Market street ferry is known as Station D.

All the mails received and dispatched from the San Francisco post-office are handled at the two points named. The last-named depot becomes much more important with the completion of the Coast Line Division of the Southern Pacific Company, which is now believed to be within a period of less than six months, when trains to and from Los Angeles and the Sunset Route to El Paso and New Orleans will be run to Third and Townsend streets instead of via Oakland and the Market street ferry.

The change in the railroad service mentioned and the completion of the main floor of the new Government building and its occupancy by the general post-office means quite a radical change in the present conditions and opens the way toward a general improvement of the mail facilities of the city of San Francisco, and will, as well, emphasize

the necessity for the best and quickest mail service obtainable. The collection of mail over the large territory of the city south and west of a radius of 1 mile of the Market street ferry and now supplied through branch post-office Stations B, C, G, and H, will be concentrated at the new general post-office instead of being carried by the mounted collection and street railway post-office service to Station D. Station B, which is the largest station after D, will of course be abolished and the district served from the general post-office, and a general shifting of delivery districts will then be necessary. A first-class transportation service between this new general post-office and the Market street ferry and Station D, and also with the Third and Townsend street depot, must be provided. The service that will be required to the new general post-office will not decrease the transportation service from Station D, and it must be considered as additional to the present cost.

The situation is therefore most opportune for the inauguration of a pneumatic-tube service on Mission street from the new general post-office via Station K to Station D and the railroads at Market street ferry—distance 1.50 miles—and on Third street to Station E and the trains at the Third and Townsend street depot. The latter line can be provided for from Station K, the intermediate station on the main route from general post-office to Station D, which is now located on New Montgomery street near Mission, but on which a change in location to Mission street in that vicinity is under consideration, and the distance on that line will be about 1 mile.

The two lines of tubes, involving a mileage of 2.50 miles, are recommended, it being our belief that its introduction will provide a quick and reliable mail service between the points named, which is actually demanded by present conditions, and which are certain to become more pressing in the near future.

This favorable recommendation is made dependent upon reasonable and consistent propositions being submitted to install the system outlined.

The space for the installation of the tube machinery is present in Station D and Station E, and the new quarters for Station K will provide for this also, as a couple of eligible sites are now in view.

The box department and the general delivery now at the main office, Washington and Battery streets, will be removed, of course, to the new general post-office. Twenty-five thousand letters are now delivered daily in this way.

It is believed from the data at hand that about 50 per cent of the first-class mail deliverable in the city will be transmitted through the tubes, and almost as large a proportion of the mail collected.

The routes mentioned are along streets which are perfectly level, and no hills or grades will contribute to a larger expense for power. No topographical features are present to interfere with cheap construction.

The amount of mail to be handled will, we believe, require an 8-inch tube, more especially between the general post-office and Station D, and it will be necessary for a perfect operation of the two lines herein recommended that they be of a uniform size and the carriers interchangeable, so that mails will not have to be transferred from one carrier to another at Station K, the intermediate point.

The relocation of Station K and the assignment of twenty carriers there, which now serve the same districts from Station D, which will be possible with the tube service, will effect a saving of from five to ten minutes' time on each trip of each carrier, and in all probability about \$900 in street-car fares, besides giving the mail to patrons earlier. The slightly greater rental for the new quarters will be more than offset by saving in car fares, and time of carriers saved equal to probably three carriers, which can, of course, be used for additional delivery service elsewhere in the city.

We are unable to state with much positiveness the exact economies that may be effected by the proposed pneumatic-tube service in the cost of service based upon conditions that will exist when the new post-office building is occupied, but it can roughly be estimated, in addition to that already named, to include—

Reduction in wagon service, Station D to Station E and Route 176002, from 12 round trips to about 3, saving \$1,000.

Discontinuance of Market street railroad post-office service and service of one railroad postal clerk, \$4,000, from which amount should be deducted estimated cost of wagon or closed-pouch service to Station H, \$1,000, saving \$3,000.

The total of these several items appears to be about \$10,000 per annum, estimating that any suitable wagon service to supply the new general post-office as being equal to one-half the cost of present wagon service to and from Station D, or \$2,500 per annum.

Other considerations that appeal to us as being factors leading to the favorable indorsement of the pneumatic-tube service is the slow time that can be made by wagon service in the vicinity of Market street ferry. The street-car traffic and the teaming of merchandise and other freights all come to a point in front of Station D, and the slowest time only can be made by mail wagons. The time to Route 176002 from Station D is officially named in the contract on the wagon route as fifteen minutes, but it has been necessary to lengthen this out to twenty-five minutes each way to insure connections to be made with trains.

When the new building is completed and the general post-office relocated the present main office district will be served by a branch post-office station located in the immediate vicinity, in order that the large commission, fruit, and produce business may be properly served. It is about 3,000 feet distant from Station D, and there is half-hourly wagon service during the entire business day, giving a very fair interchange of mails.

A line of pneumatic-tube service via the main office from Station D to Station A and Station F, along Sacramento street, distance 2.65 miles, was considered by this committee, but it is agreed that the very steep grades of this route will make it quite expensive; and while there are features of that service which make it very attractive, we believe the question of connecting those stations must be from the new general post-office via Polk and Fillmore streets, so that the extremely high grades of Sacramento street may be almost entirely avoided.

The same consideration was given to proposed tube service from Station B to Station H, distance 2,700 feet, and from Station B to Station C, a distance of 1.43 miles, but we are of the opinion that such service must be from the new general post-office, and that the question of supplying pneumatic-tube service to Stations A, F, H, G, and C

ought to be considered in the light of the experience gained in the practical operation of that service as recommended in this report, and when the service in each of those several districts has been rearranged after the occupation of the new general post-office. We believe the mails in those districts will be increased quite steadily, as they are building up faster than other sections of the city, and we recommend that consideration be given to the means required to provide the improved service to the sections of this city represented by Stations A, F, H, G, and C, when the initial service as recommended by this committee shall have been provided.

We beg to attach herewith a map of the city with the routes recommended laid out, and also statistics of the amount of mail delivered. This table does not show the mail collected by station districts, but the total for the whole city amounts to about 195,000 pieces first-class mail daily, of which 120,000 pieces were collected by carriers and 75,000 pieces were deposited as drops in the present main office and Station D.

The detailed estimates of the cost of the service laid out have not been received from the representatives of the Batcheller Pneumatic Tube Company and the American Pneumatic Service Company, who were in attendance on the meetings of the committee, but the proposed pneumatic-tube routes have been communicated to these representatives, with request that the estimates be made and submitted to Postmaster Montague as soon as practicable, and when received the same will be forwarded to the general committee in Washington, to be filed in your office and made a part of this report.

We have recommended the pneumatic tube outlined in this report with the understanding that the specifications and propositions submitted therefor are deemed reasonable in the opinion of the Department.

It is our belief, also, that the most feasible plan for the operation of the pneumatic-tube service is to contract with a responsible company on a rental basis for the construction and operation of the same, to carry any mail that may be delivered to them which from its size can be forwarded by tube.

While it is confidently expected that the new Government building at Seventh and Mission streets, in which the general post-office is to be located, will be ready for occupancy within two years, the installation of pneumatic-tube service between Station D, via Station K, to Station E and Southern Pacific passenger station, at Third and Townsend streets, need not be delayed should any unforeseen delay occur in the completion of the new post-office building.

Very respectfully,

W. W. MONTAGUE,
Postmaster.

H. P. THRALL,
Superintendent Railway Mail Service.

J. M. MASTEN,
Chairman.

J. A. MONTGOMERY.
E. W. ALEXANDER.

Statement of daily average weight of letter mail received and dispatched between Station D and Southern Pacific depot, at Third and Townsend streets.

DISPATCHED.

Time.	Weight.	Number of letters, estimated at 50 per pound.
	Pounds.	
5.45 a. m.	141	7,050
6.25 a. m.	111	5,550
6.30 a. m.	49	2,450
8.40 a. m.	18	900
10.10 a. m.	13	650
11.10 a. m.	22	1,100
1.10 p. m.	18	900
2.25 p. m.	55	2,750
5.10 p. m.	14	700
Total.....	441	22,050

RECEIVED.

	Weight.	
	Pounds.	
7.00 a. m.	27	1,350
8.50 a. m.	8	400
10.05 a. m.	2	100
11.10 a. m.	42	2,100
2.00 p. m.	19	950
4.40 p. m.	122	6,100
8.00 p. m.	25	1,250
Total.....	245	12,250

Statement of daily average weight of mail delivered by letter carriers from main post-office and stations.

	Number carriers.	Weight.		Number of letters, estimated at 50 per pound.
		Letters.	Papers.	
		Lbs. oz.	Lbs. oz.	
Main office.....	30	543 13	858 14	27,191
Station A.....	21	224 3	734	11,209
Station B.....	28	300 5	723 14	15,016
Station C.....	24	133 10	510 13	6,682
Station D.....	40	1,157 8	1,659 2	57,875
Station E.....	16	98 6	226 3	4,919
Station F.....	18	135 9	442 6	6,778
Station G.....	11	54 11	236 13	2,735
Station H.....	12	97 10	354 15	4,882
Station L.....	1	3	11 13	150
Station M.....	4	22 2	108 1	1,107
Total.....	205	2,770 13	5,866 14	138,544
General delivery, main office.....		63 12	163 13	3,188
Box department, main office.....		447 3	1,145 15	22,360
Grand total.....		3,281 12	7,176 10	164,092

NOTE.—These figures were taken from actual weights made March 21 to March 31, inclusive, 1900, with 5 per cent added for increase since weights were taken.

Detailed statement of gross receipts of the post-office for fiscal year ended June 30, 1900.

Station A.....	\$28,531.91
Station B.....	47,963.25
Station C.....	25,008.16
Station D.....	113,559.60
Station E.....	17,488.55
Station F.....	19,715.05

Station G	\$9,377.85
Station H	14,894.10
Station K	208,936.25
Station L	631.91
Station M	2,216.20
Station O	62,821.24
	\$551,224.07
General post-office	473,350.93
Total	1,024,575.00

Comparative speed pneumatic tube and other mail service in city of San Francisco, Cal.

Points.		Distance.	By wagon.		By street car.		Time by "tube" proposed.
From—	To—		Time.	Daily trips.	Time.	Daily trips.	
		<i>Feet.</i>	<i>Minutes.</i>		<i>Minutes</i>		<i>Minutes.</i>
General post-office	Station D	3,180	10	24	-----	-----	1½
Station D	Station A	9,356	-----	-----	14	10	4
Station A	Station F	4,048	-----	-----	6	10	2
Station D	Station K	3,580	-----	-----	6	9	1½
Station K	Depot, Third and Townsend and station E.	5,350	a 25	a 9	-----	-----	2
Station D	New general post-office.	8,000	b 25	b 15	b 16	b 9	3
Station K	Station C	13,460	-----	-----	20	9	6
Station D	Station B	10,100	-----	-----	16	9	4
Station B	Station G	7,650	-----	-----	12	4	3
Station B	Station H	2,700	-----	-----	4	9	1½

a From Station D.

b Proposed.

Respectfully submitted in connection with report of October 25, 1900.

J. M. MASTEN, *Chairman.*

DECEMBER 8, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: As stated in the joint committee report of pneumatic tube service in San Francisco, Cal., forwarded from that city under date of October 25, 1900, the American Pneumatic Service Company of Boston and the Batcheller Pneumatic Tube Company of Philadelphia were asked to submit propositions on the construction and operation of 2.44 miles of 8-inch tube service in San Francisco, connecting the new general post-office building with stations D, E, and K, and the Market-street-ferry and Townsend-street depots.

The propositions have been received by the general committee, but owing to the lack of time to communicate with the local committee in San Francisco we have concluded to submit them as received, and inclose them herewith, and have notified Postmaster Montague and Superintendent Thrall of this action.

The proposition of the American Pneumatic Service Company calls for an annual rental of \$50,917; this amount being obtained by adding the cost of operation, \$36,805 per annum, to the sum of \$14,112, which is 10 per cent of the estimated cost of construction.

We have not attempted to revise the figures of this estimate, as the items are not sufficiently definite to enable us to do it intelligently.

The proposition of the Batcheller Pneumatic Tube Company proposes an annual rental of \$60,924.66, which is the amount of operating expenses, \$35,699.93 added to 10 per cent of the cost of construction—

i. e., \$25,224.73. It is our opinion that the rental asked by this company can be reduced from \$60,924.66 to \$46,311 per annum by cutting down the cost of station labor from \$10,800 to \$3,600, which can be done by utilizing the time of post-office clerks in receiving and dispatching the tube carriers and requiring the tube company to provide only enough additional labor to act as care takers of the machinery, or 6 operators and compressormen, instead of 12 operators and 6 compressormen provided for in the estimate. By constructing the power plant in the new Government post-office building instead of a separate building \$20,156 is saved in construction, which represents, at 10 per cent, \$2,015 annual rental and \$1,300 annual taxes and insurance. By combining repair shop and power-station labor \$1,800 of this item can be saved.

These amounts together aggregate \$12,315, thus reducing the annual rental to \$48,609.66, and this sum can be still further reduced if an amount equal to 5 per cent on the advanced payments for engineering and office expenses during period of construction, freight charges, and Batcheller Pneumatic Tube Company charges is allowed instead of 10 per cent. These advanced payments are estimated by the company at \$43,948.70, and the modified rate of interest on this amount is \$2,197.40 per annum instead of \$4,394.80.

This committee recommends the proposition submitted by the Batcheller Pneumatic Tube Company for consideration, and is also of the opinion that the estimates made by them are generally fair and reasonable, and suggest the modifications noted above, for the reason that they are not wholly within the control of the company, but rather depend upon the view advanced by us being adopted by the Department, and in conjunction with the Treasury Department made practical of accomplishment.

Very respectfully,

J. M. MASTEN, *Chairman.*

E. W. ALEXANDER,
General Committee.

SAN FRANCISCO POST-OFFICE, OFFICE OF THE POSTMASTER,
San Francisco, Cal., November 30, 1900.

Hon. W. S. SHALLENBERGER,

Second Assistant Postmaster-General, Washington, D. C.

SIR: I beg to herewith transmit to you an estimate of the American Pneumatic Service Company, showing cost of construction, as well as operating expenses, of the proposed pneumatic-tube system for San Francisco, Cal. It will be noted that the estimate is made upon a proposed pipe extension of 12,600 feet, same being designed to connect Station D at the ferry depot with the general post-office and Station E via Station K.

I have thought it best to submit this estimate to your Department as a supplement to the more detailed report already prepared for the information of your Department by other members of the local commission.

Trusting that same may be found of service, I am,

Yours respectfully,

W. W. MONTAGUE, *Postmaster.*

AMERICAN PNEUMATIC SERVICE COMPANY,
89 State street, Boston, November 21, 1900.

J. M. MASTEN, *Chairman of Commission*, and
W. W. MONTAGUE, *Postmaster, San Francisco, Cal.*

GENTLEMEN: I beg to inclose copy of estimate of cost of construction as well as of operating expenses for the proposed pneumatic-tube system for San Francisco, Cal. I also wish to call your attention to the fact, minuted on the bottom of the page of operating expenses, that taxes and insurance are not included in the estimate. The only variation which these figures would be subject to would be changes in market prices of materials and freight rates.

All of which is respectfully submitted.

AMERICAN PNEUMATIC SERVICE COMPANY,
W. E. L. DILLAWAY, *President.*

Estimate of cost of construction of 8-inch pneumatic-tube system for San Francisco, Cal.

[Station D at ferries to general post-office station at K (distance, 7,500 feet); Station K to Station E (distance, 5,100 feet); total distance, 12,600 feet.]

25,200 feet of iron pipe, at \$1.35	\$34,020	
25,200 feet of iron pipe laid, at \$0.35	8,820	
Excavation, 12,600 cubic yards, at \$1	12,600	
Concrete base for pipe, 1,555 cubic yards, at \$4.05	6,297	
10 sets bends, at \$300	3,000	
40 reducers, at \$50	2,000	
20 drips, at \$12.80	256	
Machine work	1,500	
		\$68,493
Terminals:		
6 transmitters, at \$800	4,800	
3 open receivers, at \$400	1,200	
3 closed receivers, at \$800	2,400	
125 carriers, at \$18	2,250	
		-10,650
		79,143
Power plant:		
6 compressors, at \$2,200	13,200	
6 motors, at \$1,200	7,200	
Piping	4,500	
Foundations	3,000	
Air tanks, etc	2,250	
		30,150
		109,293
Engineering expense	4,000	
Freight, cartage, etc	15,000	
		128,293
10 per cent for contingencies	12,829	
		141,122
Total		141,122

Estimate of operating expenses of 8-inch pneumatic-tube system for San Francisco, Cal.

[Station D at ferries to general post-office station at K (distance 7,500 feet); Station K to Station E (distance 5,100 feet); operating from 4 a. m. to 11 p. m.]

1 superintendent	\$900
1 repair man	780
12 operators, at \$780	9,360
1 substitute	600
1 inspector	600

Rent repair shop	\$600
Power for shop	450
Wear and tear account, 30 carriers per month, at \$3.95, \$118.50 per month, yearly	1, 422
Telephone service, 3 lines (private wire)	400
Power room:	
62 horsepower, at 3 cents per kilowatt hour	10, 948
3 engineers, at \$780	2, 340
Oil, waste, etc.	900
Depreciation of power plant, 10 per cent	4, 080
Depreciation of pipe line, 5 per cent	3, 425
Interest on investment, 10 per cent	14, 112
Total	50, 917

NOTE.—These estimates do not include taxes and insurance.

THE BATCHELLER PNEUMATIC TUBE COMPANY,
WITHERSPOON BUILDING,
Philadelphia, December 5, 1900.

PNEUMATIC TUBE INVESTIGATING COMMITTEE,
San Francisco, Cal.

GENTLEMEN: Replying to your request for an estimate of the proposed system of pneumatic tubes in the city of San Francisco, we beg to submit the following. Our estimate comprises three double lines of 8-inch tubes:

First. A line connecting the new central post-office with Station K along the following route: From the new central post-office north on Mission street to Station K.

Second. A line connecting Station K with Station D along the following route: From Station K along Mission street to East street, north on East street to Station D.

Third. A line connecting Station K with Station E along the following route: From Station K along Mission street to Third street, south on Third street to Townsend, west on Townsend to Station E.

The length of these lines is given in the following table:

	Miles.
Central post-office to Station K	0. 773
Station K to Station D	0. 705
Station K to Station E	0. 962
Total	2. 440

For the operation of all these lines we propose the erection of a central power station, to be located at some convenient point along the line of a railroad at a distance not more than half a mile from one of the postal stations, preferably as near as possible to the center of the system. In this central power station we will erect boilers and engines with directly connected dynamos which will generate electric currents of high voltage. We propose the laying of underground conduits beside the tubes, with cables drawn into the conduits by means of which electric power can be distributed to all the postal stations. In each postal station we propose the erection of air compressors or blowers, driven by electric motors, which will draw their energy from the central power station. In order that the electric cables for the distribution of power shall not be too large, a high voltage will be used, with transformers at each postal station to transform from a high to a low voltage a sufficient amount of electric current to operate the motors in the respective stations.

The equipment of each station will include, beside the motors and transformers, switchboards and all necessary instruments. Each blower or air compressor will have an electric motor geared to it which makes it very compact, occupying a small amount of space. Such a system of power distribution reduces the space occupied by the tube apparatus in the postal station to a minimum. Furthermore, it avoids the use of steam engines and boilers in the post-office.

For the line equipment we propose the use of cast-iron tubes, bored smooth and accurate on the interior, and similar in all respects to the tubes now in use in New York and Philadelphia and Boston. The carriers will travel upon bearing rings composed of a material selected by us after long experience. We adopt this construction of a bored tube and sliding carriers from the following considerations: It permits the use of a carrier of great lightness and simplicity of design, easily handled by one man and opened and closed with great facility. It also permits the use of terminal apparatus that is very simple in design, which results in giving the tube an

enormous carrying capacity, so that, for example, an 8-inch tube may be used for a service that would otherwise require a 10-inch tube.

Within the postal stations we propose the use of our latest improved transmitters and receivers. The transmitters will be of an improved type, much more compact and simple in operation than those now in use by the Government. The receivers will be of a new and simplified type, which permits of having the end of the tube open so that carriers are free to come out however frequently they may be dispatched. There is no mechanism to get out of order and interrupt the passage of the carriers from the tube to the receiving table. We can not lay too much emphasis upon the use of this improved type of receiver. It increases the capacity of the line two or three times by allowing the carriers to be dispatched so much more frequently, and the carriers are brought to rest gradually without shock, avoiding the danger of injury to fragile articles. Several of these receivers have been constructed, one of which was on exhibition at the Paris Exposition.

There is no element of a pneumatic-tube system upon which success depends to so great an extent as upon the carrier. This will be understood when it is remembered that from 1,000 to 10,000 carriers must be filled, dispatched, and emptied at each station during the day. Lightness, simplicity, and facility of opening are essential qualifications. The carriers proposed by us will be similar in design to those used in connection with the present existing lines constructed by this company in Boston, New York, Brooklyn, and Philadelphia, embodying, however, some improvements. It will weigh but 16 pounds and will open for its full diameter at the rear end. The latter feature greatly facilitates filling and emptying as compared with a carrier opening at the side. We find that the friction of the carrier in traveling through the tube is inconsiderable. Our preference for this type of carrier would not be altered if the friction were considerable, for at its maximum the friction of the carrier is small compared with that of the column of air. The bearing rings of the carrier travel 10,000 miles without renewing and, as they fit closely to the walls of the tube, they reduce the leakage past the carrier to a minimum.

When the system is installed, carriers can be dispatched at the rate of 10 per minute; therefore the capacity of each section of each line will be 6,000 per minute, or 360,000 letters per hour in each direction. The capacity for mail of other classes will, of course, be somewhat less. The average speed of the carrier will be about 44 feet per second; therefore the time of transit of a carrier between the central post-office and Station K will be 1 minute and 32 seconds.

Of course it is impossible to give an accurate estimate of the cost of constructing such a system until the rights of way have been obtained and the ground purchased for the erection of a power house. We have estimated, however, as carefully as possible, that the complete system above described can be installed for the sum of \$252,247.31.

This assumes that the ground for the central power station can be purchased for \$4,000, and the building erected for \$8,000. No allowance has been made for the cost of obtaining rights of way or of changing existing underground construction.

The following tables contain an itemized statement of the cost of constructing this entire system as we have estimated it:

Cost of construction.

Engineering expenses (6 months):	
1 chief engineer	\$1, 500. 00
1 first assistant engineer	900. 00
2 inspectors	1, 200. 00
1 chief draftsman	600. 00
3 draftsmen	540. 00
1 instrument	150. 00
Drawing-room supplies	250. 00
Traveling expenses	500. 00
Total	<u>5, 640. 00</u>
Office expenses (9 months):	
Bookkeeper	585. 00
Stenographer	468. 00
Office boy	156. 00
Office rent	975. 00
General expense	500. 00
Furniture	500. 00
Total	<u>3, 184. 00</u>

Central power station:	
Ground	\$4,000.00
Building	8,000.00
Chimney	2,000.00
Engines and dynamos	10,500.00
Boilers	5,000.00
Condensers	1,800.00
Pumps	400.00
Foundations	1,800.00
Steam and water piping	2,000.00
Switch boards	1,000.00
Wiring and lighting	300.00
Traveling crane	1,200.00
Plumbing and gas fitting	250.00
Repair equipment	2,000.00
Transformers for lighting	100.00
Furniture	100.00
Telephone exchange	250.00
Total	<u>40,700.00</u>
Equipment of postal stations, central post-office:	
1 transmitter	1,000.00
1 receiver	700.00
2 compressors	5,000.00
Piping	1,500.00
Foundations	500.00
Erection	300.00
Plumbing	75.00
Lockers	50.00
Repair of building	100.00
1 tank	115.00
1 telephone	25.00
2 electric motors, 15 horsepower	1,316.66
4 transformers	120.00
1 switch board	250.00
1 telephone cable head	8.00
Total	<u>11,059.66</u>
Summary of postal stations:	
Central post-office	11,059.66
Station K	24,250.66
Station D	11,059.66
Station E	11,118.00
Total	<u>57,487.98</u>
Construction of lines—Line A, central post-office to Station K:	
7,830 feet iron tubing, at \$1.50	11,745.00
22 brass bends, at \$250	5,500.00
79 short lengths, at \$1	79.00
11 dutchmen, at \$75	825.00
16 drips, at \$32	512.00
4,080 feet trench, at \$1.40	5,712.00
Entering tubes in post-office	1,000.00
2,200 square yards paving (basalt), at 54 cents	1,188.00
4,080 feet power cables, at 67 cents	2,733.60
4,080 feet telephone cables, at 15 $\frac{1}{10}$ cents	616.08
4,080 feet conduits, at 39 cents	1,591.20
12 manholes, at \$50	600.00
Total	<u>32,101.88</u>
Summary of lines:	
Central post-office to Station K	32,101.88
Station K to Station D	30,970.92
Station K to Station E	39,661.38
Total	<u>102,734.18</u>

Installation of electrical equipment.....	\$500.00
Conduits and cables from power house to nearest station (2,640 feet), including excavating, filling, and paving trench	4,956.45
96 carriers, 8-inch	1,920.00
Freight on apparatus to San Francisco	12,193.13

FINAL SUMMARY.

Central power station.....	\$40,700.00
Equipment of postal stations	57,487.98
Construction of lines	102,734.18
Engineering expenses	5,640.00
Office expenses.....	3,184.00
Installation of electrical equipment.....	500.00
96 carriers	1,920.00
Freight on apparatus to San Francisco	12,193.13
Conduits from power house to nearest station	4,956.45
10 per cent to the Batcheller Pneumatic Tube Company.....	22,931.57
Total	252,247.31

Cost of operation.

The cost of operation, based on 20 hours a day and 310 days in the year, has been estimated as follows:

Superintendence	\$1,800.00	Repair-shop labor	\$2,936.50
Office expenses.....	2,236.00	Auxiliary power	467.10
Office labor	1,612.00	Carrier repairs	1,285.00
Station labor	10,800.00	Machinery supplies	300.00
Power-station labor.....	3,060.00	Repair supplies.....	2,000.00
Coal.....	7,006.50	Taxes	800.00
Water	513.83	Insurance.....	500.00
Supplies	310.00		
Ashes removed.....	73.00	Total	35,699.93

The above estimate for the central power station includes the items of coal and water, the hauling of ashes, and the salaries of 2 enginemen and 2 firemen, which is a minimum complement of attendants.

All of the stations combined require 12 operators and 6 compressormen. The administrative expenses include the salaries of the general superintendent, book-keeper, stenographer, the cost of stationery, postage, and office supplies, office rent, and charge for telephone service.

We have estimated taxes and insurance upon the central power station, but this does not include the taxes upon tubes and machinery which may be taxed as personal property. We have included no tax upon the item of franchise.

The expense of the repair shop includes the salaries of a master mechanic, 1 machinist, 1 electrician, and 1 helper, together with the cost of bearing rings for carriers and machine parts to replace those broken or worn out.

The item of supplies covers oil and waste, a considerable quantity of which will be necessary.

Basing the rental to the Government upon the net operating expenses and 10 per cent of the cost of construction, the annual rental will be—

Operation.....	\$35,699.93
10 per cent of construction	25,224.73
Total	60,924.66

This sum (\$60,924.66) will be our annual charge for the service, predicated upon the above estimate.

We desire to emphasize the fact that the above estimate of the cost of operation, which constitutes nearly 60 per cent of the rental just named, is based upon the assumption that we are to operate the system independent of the post-office, furnishing all supplies and labor; no assistance whatever to be rendered by post-office employees in the handling of carriers. It should be pointed out that the labor to be performed at the stations will in no case be sufficient to occupy the entire time of the man to be stationed there by us. If this man were a post-office employee he could be engaged upon post-office work during the interval when he would otherwise be idle.

We will also say that in many cases, when the exact circumstances are known, it may be possible to dispense with the compressor men.

Under the most favorable circumstances, therefore, the item \$10,800 for station labor might be materially reduced by Governmental operation.

Respectfully submitted.

J. E. MILHOLLAND, *President.*

WASHINGTON, D. C., *June 12. 1900.*

HON. CHAS. EMORY SMITH,
Postmaster-General, Washington, D. C.

DEAR SIR: In compliance with your verbal request, of Saturday last, that I suggest an outline of my ideas concerning the scope and character of the proposed investigation of the pneumatic-tube system in connection with the postal system for the larger cities of the country as provided by act of Congress, I beg to submit the following: Having in mind the apparent deep-seated conviction of many members of Congress to the effect that if the tubes are to be used at all they should be owned and operated by the United States Government, I would recommend—

First. That the actual cost of construction per mile be ascertained. This would involve an inquiry as to what it would cost per length of pipe to cast the same; what it would cost to bore the same, and what it would cost to connect and lay the same, including street work.

Second. The cost of necessary machinery for the terminal and intermediate stations, switches, turn-outs, etc., assuming that the necessary house space for operation would be provided by the Government in the terminals and branch offices connected.

Third. In connection with Government ownership, what the probable cost, if any, of local franchise would be. In this connection it is my opinion that the city of Chicago, as well as the other large cities of the country, would readily grant permission to the Government to lay tubes for the transmission of the United States mails, and, therefore, there would be practically no expense for franchises or street rights except cost of city inspection.

Fourth. To ascertain the actual cost of operation and maintenance per mile, basing the employees' wages on the figures now paid by the several local companies performing the present service in New York, Philadelphia, and Boston.

Fifth. Ascertain by legal and other inquiry whether existing patents would bar the United States Government from conducting a postal pneumatic system without acquiring the rights from the owners thereof. If patent rights must be acquired by the Government, then ascertain the best terms upon which they could be had. I am informed that a large number of patents exist, owned by at least two corporations.

Sixth. Maps, plans and surveys of the largest cities should be prepared (in conjunction with the local postmasters) showing the necessary lines demanded in each city for the transmission of the mails, the length of each line, the number of stations on each line, the present amount of mail now being transported each way over the proposed lines, and how many wagons or how much electric street-car service, or both, the use of said lines would displace. The said plans could be drawn so they would reflect the judgment of the local postmaster and Government expert as to the most important line to build first, second, and so on.

Seventh. An actual computation of the number of pounds of mail transported over the proposed lines at present, together with the average revenue, annually, from each branch station to the Government. The annual normal increase, and the opinion or estimate of the local postmaster and his assistants as to the probable increase of mail matter and revenue which would accrue (over the normal) by the use of tubes.

Eighth. A comprehensive report from each local postmaster and others (in the cities and towns to be covered) indicating their opinion and reasons therefor as to what, if any, benefit would accrue to other cities and country towns reached through their various offices, should transportation of mails within their cities be accomplished by pneumatic tubes, instead of by wagons or electric service.

Ninth. Ascertain the actual cost of construction and the actual cost of operation and maintenance of the several lines at present being operated by the Government, and secure a proposal from each one of them covering the terms upon which they would sell their plants (not city franchises) to the Government, and also proposal setting forth upon what terms of rental they will continue to carry the mails for the succeeding four years after June 1, 1901, over the lines now in existence.

Tenth. A statement (from the local postmaster) giving the actual time now employed between each terminal and other station by wagon or street-car service and the actual time that would be consumed by the pneumatic-tube service.

Having ascertained all the details and facts which the inquiry above suggested would develop, it would be not difficult to formulate a concise statement showing:

First. Number of miles of tube in each city.

Second. Number of terminal and branch stations.

Third. Amount of mail transported and estimated amount of income therefrom.

Fourth. Cost of construction, operation, and maintenance per mile.

Fifth. Cost (if anything) of use of patents.

Sixth. Number of minutes saved per mile (shown by each line).

Seventh. Excess of cost, if any, per mile of transporting the mails in large cities by pneumatic tube, instead of by wagon or street car. This will be independent of the question as to whether tube service would increase the revenue or not.

Eighth. The probable saving in cost of equipment.

The act of Congress contemplating a full investigation of the utility of the postal tube system will necessarily require a rigid investigation of scores of details which I have omitted in this letter because of your suggestion to make it general. Among these details will come the saving, if any, on the use of equipment. Some important claims have been made in this direction by existing companies before Congressional committees. All of which is respectfully submitted for your consideration.

I have the honor to be, your obedient servant,

WM. R. KERR.

OFFICE OF THE POSTMASTER-GENERAL,
Washington, D. C., June 16, 1900.

Postmasters and contractors for pneumatic-tube mail service.

GENTLEMEN: This will introduce to you Mr. William R. Kerr, with whom I have arranged to make some investigation and obtain certain information for me concerning the system of pneumatic tubes for the transmission of mail, pursuant to the act of Congress of June 2, 1900. I will thank you to extend to him such facilities and render him such assistance in connection with this matter as may be in your power.

Very respectfully,

CH. EMORY SMITH,
Postmaster-General.

JULY 18, 1900.

MR. WILLIAM R. KERR,
Hotel Manhattan, New York, N. Y.

SIR: The Postmaster-General has received your letter of the 10th instant, stating that your work in connection with the investigation of the pneumatic-tube question, so far as New York is concerned, is progressing satisfactorily, etc., and he requests that you submit a report showing the result of your investigation from the date you began up to July 25, 1900, and that you discontinue your work after that date.

Very respectfully,

G. F. STONE,
Acting Second Assistant Postmaster-General.

PHILADELPHIA, July 23, 1900.

HON. G. F. STONE,
*Acting Second Assistant Postmaster-General,
Washington, D. C.*

DEAR SIR: I have the honor to acknowledge the receipt of your letter dated the 18th instant addressed to me, care of the Manhattan Hotel, New York City.

Having finished my examination and investigation, as far as was then possible in New York City, I came here on the 12th instant, and have since then been making the necessary investigation and collection of data for Philadelphia, as was made in New York.

I acknowledge notice through your communication from the Postmaster-General requesting me to make my report and discontinue the investigation on July 25, and will comply with the same, as requested.

It may possibly be necessary for me to give two or three day's additional time beyond the 25th, in which to secure necessary figures and data desired by the Department, but before the end of this week I shall be in Washington with my report, together with the maps and other information secured.

Another week spent in Boston would complete the necessary information desired by the Department concerning the existing plants, their cost of construction, the amount for which they could be purchased, etc., but unless I hear from you to the contrary I shall not undertake the Boston investigation. My address here is Hotel Walton. I have the honor to remain,

Your obedient servant,

WM. R. KERR.

WASHINGTON, D. C., *August 3, 1900.*

HON. CHARLES EMORY SMITH,

Postmaster-General, Washington, D. C.

SIR: In accordance with the instructions contained in a letter from the Acting Second Assistant Postmaster-General, dated July 18, I have concluded the investigation of the pneumatic-tube question as far as New York City and Philadelphia are concerned, and have the honor herewith to submit my report covering the same. After receiving my commission or letter of appointment from you, I called, as instructed by you, upon Mr. G. F. Stone, Acting Second Assistant Postmaster-General, and with him went over the letter which I addressed to you, dated June 12, 1900, which letter Mr. Stone directed me to follow as a basis for my investigation. I had no other instructions from him. After going to Chicago for a few days I went immediately to New York. I called upon the Hon. Cornelius Van Cott and presented my letter, and together with Mr. Van Cott and Mr. Morgan we discussed very fully the needs of New York City in case the pneumatic-tube system for carrying the mails should be extended. After securing their views concerning the branch stations to be connected, I visited, in company with the engineer of the New York Tubular Dispatch Company, all the branch stations at present connected by tube with the general post-office, and fully and thoroughly investigated the utility of the system as at present operated. I undertook to ascertain from each superintendent of these branch stations their objections, if any, to the system, and on the other hand requested them to point out the advantages. Had there been any important difference in their statements I should have taken each one in writing, but finding no objections to the system, but on the other hand general commendation and approval together with a strong desire to see the system extended, I decided to merely report these facts as being the sentiments expressed by each and every one of the superintendents in charge at branch post-offices in New York. I then visited and inspected the route proposed from the general post-office for the new lines, to wit: From the general post-office on Park Place to West Broadway; on West Broadway to Station V on Canal street; from V on Canal street to Greene street; thence on Greene street to Station A on Greene between Prince and Houston streets; thence on Greene street to West Third street; thence on West Third street to West Broadway; thence on West Broadway to West Fourth street; thence through Washington square to Fifth avenue; thence north on Fifth avenue to Seventeenth street at Station O; thence north on Fifth avenue to Twenty-third street; thence west on Twenty-third to Sixth avenue; thence north on Sixth avenue to Thirty-first street, Station E; thence north on Sixth avenue to West Forty-fifth street; thence east on Forty-fifth street to Lexington avenue at Station H. This line together with a branch line running from Station O south on Fifth avenue to West Thirteenth street; thence on West Thirteenth to an intersection of Eighth and Greenwich avenue and Jackson square; thence south on Eighth avenue to Station C at Bethune street and Greenwich street; thence south on Greenwich street to Morton street, and thence west to Washington street to the new station for "foreign mails" (which has not yet been designated by letter) constitutes the first line recommended by the postmaster for construction. The second line recommended for construction by the postmaster commences at Station H and runs west on Forty-fifth street to Broad-

way boulevard; thence northwest on Broadway boulevard to West Fifty-first street at Station G; thence northwest on Broadway boulevard to West Fifty-eighth street; thence through Columbus monument square into Broadway boulevard; thence northwest on Broadway boulevard to Sixty-eighth street, Station N; thence north on Amsterdam avenue to West Eighty-fourth street; then a loop east on Eighty-fourth street to Columbus avenue to Station W; thence east on Eighty-fourth street to Amsterdam avenue; thence north on Amsterdam avenue to West One hundred and sixth street; thence a loop on One hundred and sixth street east to Station I; thence west on One hundred and sixth street to Amsterdam avenue; thence north on Amsterdam avenue to One hundred and twenty-fifth street to Lexington avenue to Station L; thence east to Third avenue; thence south on Third avenue to East One hundred and third street to Station V; thence south on Third avenue to East Eighty-sixth street to Station K; thence south on Third avenue to East Sixty-seventh street to Station Y; thence south on Third avenue to East Forty-fourth street; thence west on East Forty-fourth street to Station H, the place of beginning.

After the routes had been fully decided upon, the Tubular Dispatch Company offered to prepare a map of the city showing the present and proposed lines; this map has the autograph approval of the postmaster, and is submitted herewith for your information, and marked Schedule A.

After the route in New York had been agreed upon and the map completed, I addressed a letter to the Tubular Dispatch Company asking them to submit a proposal to you not later than September 15, 1900, stating at what price they will construct the proposed extension system of pneumatic tubes for New York City, as approved by Hon. C. Van Cott, postmaster. These figures are to show what the line from the general post-office to Station H and the line from Station H to Harlem or One hundred and twenty-fifth street will cost separately. In said letter I also requested the company to submit to you the price and terms upon which they would sell to the United States Government the existing pneumatic-tube system in New York City. I also requested them in said letter to state upon what terms they would contract to carry the mails through said pneumatic tube system (as it now exists) from June 30, 1901, to June 30, 1902. I also requested them to state the terms upon which they would agree to carry the mails per annum through the tubes of the proposed extension system, copy of which I inclose herewith, marked Exhibit B; I also addressed a letter to the New York Mail and Newspaper Transportation Company, asking that they submit to you, on or before September 15, a proposal stating the price and terms upon which they would sell the existing pneumatic tube system between the New York and Brooklyn post-offices to the United States Government. I also asked them to submit to you the terms upon which they would agree to carry the mails through said system from June 30, 1901, to June 30, 1902, copy of which letter I hand you herewith, marked Exhibit C.

Having finished the work in New York as far as was possible at that time, I went to Philadelphia on July 11, and beg to submit the following concerning that city.

I found Postmaster Hicks anxious to furnish all possible information and data in his power. I inspected the working of the tube from the general post-office to the Bourse (6-inch tube), and also from the

general post-office to the Reading Terminal and the Pennsylvania railroads. I visited and inspected several times the branch stations at the Reading and Pennsylvania stations, and the one at the Bourse. I found the superintendent at the Bourse (McGinnis) the most ardent advocate of the tube system for carrying mails I ever met. He explained what he considered the great advantage of the tube system to the merchants and others contiguous to the Bourse station. I then took up the question of an extension of the system with Postmaster Hicks, and without giving the lines proposed herein I submit a map herewith of Philadelphia showing the stations recommended by him to be connected. I have marked the map Exhibit D, and you will note it bears on its face the approval of the postmaster. I then addressed a letter to the Pneumatic Transit Company (the local corporation) asking for the same information as requested from the New York company. copy of which letter I submit herewith, marked Exhibit E. I also addressed a letter to the Batcheller Pneumatic Tube Company of Philadelphia, asking them to submit to you a proposal stating the price at which they would license the United States Government to use the patents of that company in the cities and towns of the United States for the transmission of mails. I submit herewith copy of said letter, marked Exhibit F.

Concerning Chicago, St. Louis, and other cities (outside of those now operating the tube), I submit herewith memoranda of suggestions handed to me by the Batcheller company, marked Exhibit G.

After finishing my investigation with the postmaster and the tube companies, I commenced an investigation of the cost of the tube, etc. I called upon Mr. W. J. Kelly, the president of the Pneumatic Dispatch Tube Works. He conducted me to his works, Tioga and Memphis streets, and gave me the best part of his time for two days. He gave me a copy of the specifications showing how the tube was made, its weight, length, etc. He stated the lowest price per foot at which it could be produced was \$1.50 per foot. When asked if others might not be able to cast and bore the tube for less money, he stated that his machinery for boring the tube was patented, and the patents were owned by him, and that therefore no one but himself could contract to deliver the finished or bored tube. I have requested and he has agreed to send you the numbers of his patents covering the process of boring the tube, and I would recommend that the question as to the validity of these patents be submitted to your legal department. I have also requested Mr. Kelly to transmit to you copies of the specifications setting forth the manner in which the tubes are to be cast, their thickness, length, weight, etc. (See Postmaster's report. Philadelphia.) I also inclose the business letter head of the Pneumatic Dispatch Tube Works (owned by W. J. Kelly), which I have marked Exhibit H. This I send to show the extent of the works required for the manufacture of the tube and pneumatic machinery.¹

Without attempting to be accurate, I should judge these works have now on hand completed tubes and machinery of the value of \$150,000.

Referring now to the sixth paragraph of my letter to you, dated June 12, concerning maps, plans, etc., of the largest cities of the country, beg to say, if you so desire, I can, through the courtesy of the Batcheller company, have the services of their principal engineer to perform this

¹Exhibit H omitted, being ordinary letter head of company.

service without any cost to the Government except his actual traveling expenses. After the routes and lines have been agreed upon and approved by the local postmaster, then the maps can be made, and they can be submitted to the tube companies for the actual figures of cost of construction in each city. After these figures shall have been received by you, in addition to those from New York, Boston, and Philadelphia, you can readily approximate (for the information of Congress) the actual amount of appropriation required to equip the principal cities.

It will be apparent to you, I think, that before correct answers can be made by the various postmasters to the queries under paragraphs 7, 8, and 10 of my letter of June 12, it will be necessary to have the proposed systems in the various cities agreed upon and the maps prepared.

In the city of New York, I am informed, the number of special-delivery stamps sold are about 300,000 per annum, and in other cities very much less in proportion. Deducting the 8 cents paid messengers for the delivery of these special letters it would seem the Government's real net income per annum from the city of New York is less than \$6,000. In discussing this matter with Postmaster Van Cott, Mr. Morgan, and the superintendents of the branch post-offices, it was generally agreed that the introduction of a reasonably perfect pneumatic-tube system would result in the public using the mails instead of the district telegraph messengers, and that the receipts from this branch of the service could and would be wonderfully augmented. I am making an effort to secure data showing the gross receipts of the district messenger service in New York, and when received will transmit the same to you for your information.

Concerning the amount of wagon and street-car service which a complete system of pneumatic tubes would displace, it may be said that if in New York and the other large cities the publishers of bound books, magazines, etc., were instructed to deliver their goods direct to the stations at the various railroad terminal stations, as is now done in Philadelphia, the amount of wagon service, taken in connection with a perfect tube system, could be reduced to the minimum. I, personally, saw several tons of this mail matter delivered to the Pennsylvania and Reading stations during my investigation in Philadelphia.

In conclusion, permit me to say that the information, full and complete, desired by yourself and by Congress, in so far as the actual cost of building the lines, the actual cost of operating the lines, the amount of rental which will be asked for the use of said lines, will all be in your hands before September 15, so far as New York and Philadelphia are concerned. My investigation has been confined to those two cities. All of which is respectfully submitted.

I have the honor to be your most obedient servant,

WM. R. KERR.

Shall be glad to furnish any further information desired or confer with you personally at any time.

The maps I have sent to your office by messenger.

W. R. K.

EXHIBIT B.

NEW YORK, *July 25, 1900.*

W. A. H. BOGARDUS, Esq.,

*Vice-president and general manager, Tubular Dispatch Company,
195 Broadway, New York City.*

SIR: For the information of the Postmaster-General I am directed to request as follows:

First. That you submit to the Postmaster-General, at your earliest convenience, and if possible not later than September 15, the price and terms upon which your company would be willing to sell to the United States Government the existing pneumatic-tube system in the city of New York.

Second. Upon what terms you will agree to carry the mails through said system as it now exists from June 30, 1901, to June 30, 1902.

Third. You are also requested to submit to the Postmaster-General, if possible not later than September 15, a proposal, stating at what price you will construct the proposed extension system of pneumatic tubes for New York City, as approved by the Hon. Cornelius Van Cott.

Fourth. Also the terms upon which you will agree to transport the mails per annum through said tubes.

Yours, truly,

WM. R. KERR.

EXHIBIT C.

NEW YORK, *July 25, 1900.*

W. A. H. BOGARDUS, Esq.,

*Vice-President and general manager,
New York Mail and Newspaper Transportation Company,
195 Broadway, New York City.*

SIR: For the information of the Postmaster-General I am directed to request as follows:

First. That you submit a proposal stating the price and terms upon which your company will sell the existing pneumatic-tube system between the New York and Brooklyn post-offices to the United States Government.

Second. Upon what terms you will agree to carry the mails through said system as it now exists from June 30, 1901, to June 30, 1902.

It is desirable that this information reach the Postmaster-General not later than September 15.

Yours, truly,

WM. R. KERR.

EXHIBIT E.

PHILADELPHIA, *July 24, 1900.*PNEUMATIC TRANSIT COMPANY,
Philadelphia, Pa.

GENTLEMEN: Under the act of Congress passed at the last session, the Postmaster-General desires:

1. A proposition from your company as to the cost of construction of the system of pneumatic tubes, approved by the postmaster of this city, for the city of Philadelphia.

2. Also the terms upon which you would contract to carry mails through said tubes per annum.

3. The actual cost of operation and maintenance, per mile, of tubing, basing the employees' wages on the figures now paid by your local company in performing the present service for the Government.

4. The actual cost of construction and the actual cost of operation and maintenance of the present lines of pneumatic tube in the city of Philadelphia.

5. He also desires a proposal from your company covering the terms upon which you would be willing to sell your plant to the Government; and also,

6. He would like a proposal from your company setting forth upon what terms of rental you will continue to carry the mails for the succeeding four years after June 1, 1901, over the lines new in existence.

An early reply to the above inquiries will be greatly appreciated.

Yours, truly,

WM. R. KERR.

EXHIBIT F.

PHILADELPHIA, *July 24, 1900.*

BACHELLER PNEUMATIC TUBE COMPANY,
Philadelphia, Pa.

GENTLEMEN: Under the act of Congress passed at the last session the Postmaster-General desires to know:

At what price you would license the United States Government to use the patents of the Batcheller Pneumatic Tube Company, in the cities and towns of the United States for the transmission of Government mails.

Asking your reply, very truly,

WM. R. KERR.

EXHIBIT G.

MEMORANDA OF POINTS TO BE COVERED BY CORRESPONDENCE BETWEEN
POST-OFFICE DEPARTMENT AND BACHELLER PNEUMATIC TUBE COMPANY.

Post-Office Department should instruct postmasters as follows:

Postmaster should designate the railway depots and postal stations that are of greatest importance and that, in his judgment, should be connected by pneumatic tube, indicating the relative importance of such depots and stations. He should take a record for a representative period, which should not be less than twenty-four hours, of the volume of the mail handled between such points. This information should then be submitted to the Batcheller Pneumatic Tube Company, with a request for its recommendations as to the best mode of connecting such points, the most economical tubes, as regards diameter, to be used, and the least expensive routes. The postmaster should supply the facts relative to the space available for tube terminals at the various points and the hours per day during which tube service is to be supplied at each depot or station, as well as any other particulars that may seem pertinent.

After receiving the recommendations of the Batcheller Pneumatic Tube Company the postmaster should examine and pass judgment upon them. When a system has been evolved between the postmaster and the Batcheller Pneumatic Tube Company that meets the views of the former and that is pronounced feasible by the latter, a drawing embodying it and bearing the written indorsement of the postmaster should be forwarded to the Post-Office Department.

Upon receipt of such drawing, the Postmaster-General should forward it to the Batcheller Pneumatic Tube Company, with a request for an estimate of the cost of construction of the system shown; also an estimate of the rental for which the tube company would construct and operate such systems for the use of the Post-Office Department.

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