

ANNUAL REPORT  
OF THE  
WIRE DEPARTMENT,  
FOR THE YEAR 1900.

[DOCUMENT 42 — 1901.]

OFFICE OF THE COMMISSIONER OF WIRES,  
11 WAREHAM STREET, BOSTON, February 1, 1901.

HON. THOMAS N. HART,

*Mayor of the City of Boston:*

SIR, — I herewith submit the Annual Report showing the appropriation and expenditure, also work performed by the Wire Department from February 1, 1900, to January 31, 1901.

January 1, 1901, found the Department in its new and modern quarters, at 11 Wareham street. The object gained by this removal is twofold. First, in obtaining quarters of sufficient size to enable the Department to do its work properly. Second, that it might establish a laboratory, which seemed absolutely essential, for the proper conduct of its business, so that all electrical devices, conductors, etc., which are to be installed for use in this City for the generating, transmission, and utilization of electric energy may be tested. The results of these tests will show whether or not said devices, etc., are sufficient or insufficient to perform the work required of them.

During the year a partial reorganization of the Department was effected, which proved beneficial to all concerned. Also a new set of Rules and Requirements for doing the work over which this Department has supervision, has been compiled, and will be ready for distribution on March 1.

I desire to thank the employees for their co-operation to increase the efficiency of the Department.

Respectfully submitted,

WILLIAM H. LOTT,

*Commissioner of Wires.*

## EXTERIOR DIVISION.

## OVERHEAD WORK.

The streets from which poles, overhead wires, cables, conductors, etc., were ordered to be removed during the year 1900 were Harrison avenue, between Dover and Northampton streets; Dover street, between Tremont and Albany streets; Wareham street, between Malden and Albany streets; Concord street, between Albany street and Shawmut avenue; and Northampton street, between Albany street and Shawmut avenue; a total distance of 10,615 feet, exceeding the amount (two miles) prescribed in Chapter 249, Acts of 1898, by 56 feet. The companies operating wires on and over these streets are actively engaged in removing the remaining wires, and when this is completed, the poles will be removed. Exclusive of the Elevated Railway Company poles, used for the support of trolley wires, there are standing in the streets named above 129 poles, occupied by the Boston Electric Light Company, New England Telephone and Telegraph Company, Suburban Light and Power Company, Fire Department, Fire Alarm Branch, and Police Signal Service, and others. There were many wires crossing the streets from buildings in addition to those on poles, the whole amounting to about 500,000 feet, much of which has already been removed. The feeders and returns of the Boston Elevated Railway Company on Harrison avenue and Northampton street, amounting to about 75,000 feet, are being removed at the present time.

The old style of roof construction is rapidly disappearing in the business section of the City, and it is seldom that a fixture is placed upon a roof except by companies operating high-potential wires. In evidence of this, I would say that in 1896, on the roofs of buildings bounded by Devonshire, Water, Congress, and State streets there were sixty-four fixtures, single and double, supporting 954 wires. These wires were anywhere from one foot to twenty-five feet above the roofs, so that in many places it was difficult to cross the roof without being in contact with a number of wires at one and the same time. To-day, there is but one fixture in this block, and ten or twelve wires, which are sufficiently high to permit of the free use of the roof. The system adopted by the Low Tension Wire Association is to trunk their wires along the walls of buildings, and not cross over the roofs. This style of construction is less expensive and less objectionable to property owners. The companies also avoid the



EDISON ELECTRIC ILLUMINATING CO, CONDUIT, ATLANTIC AVE., OPP. PEARL.

Plate No. 1.

responsibility and care of the roofs. The expense of keeping roofs on which fixtures are located in repair has always been very heavy, and a burden which the companies are striving to relieve themselves of as fast as possible. This year, as in the past, abandoned wires and fixtures have been found almost daily with no means of identification and are removed by the Wire Department.

In the City proper, north of Dover and Berkeley streets, in 1894, I estimate the number of fixtures on roofs to have been about 14,000, while to-day less than ten per cent. (10%) of that number remains, in consequence of which but little inconvenience is experienced from wires by firemen and others, whose business calls them on to the roofs of buildings.

The liability of accident from fires is growing less daily, due largely to the absence of fixtures, many of them supporting a large number of wires, and to the improvements made in construction of every description.

The most noticeable improvements in construction have been made in the business section of the City, or that portion north of Dover street, where very much of the time of the inspectors has been required. Owing to the limited number of inspectors it has been found necessary to omit from time to time the general inspection in the outlying districts, in consequence of which, no doubt, much of it will be found to be in an unsatisfactory condition.

The result of fuse inspection has been more than satisfactory, it seldom being found that an installation has been made without the line being suitably protected. This is a safeguard, and a great improvement over the conditions at the time the Wire Department was created, as inspection at that time showed that the absence of suitable protection devices was the rule rather than the exception. Wires are occasionally found that bear no tag or mark by which the ownership can be ascertained. In each case the line is traced to determine the owner, who, if found, is informed as to the requirements of this Department, which generally meets with a prompt and cheerful compliance. If the owner cannot be determined, the wire, which in such cases is usually dead, is removed by the Wire Department. Very little, if any, of this wire is of value.

Photographs showing the condition of overhead construction in and over streets have been taken from time to time, prints of which I submit with this report. I also submit a number showing the underground construction for the past year.

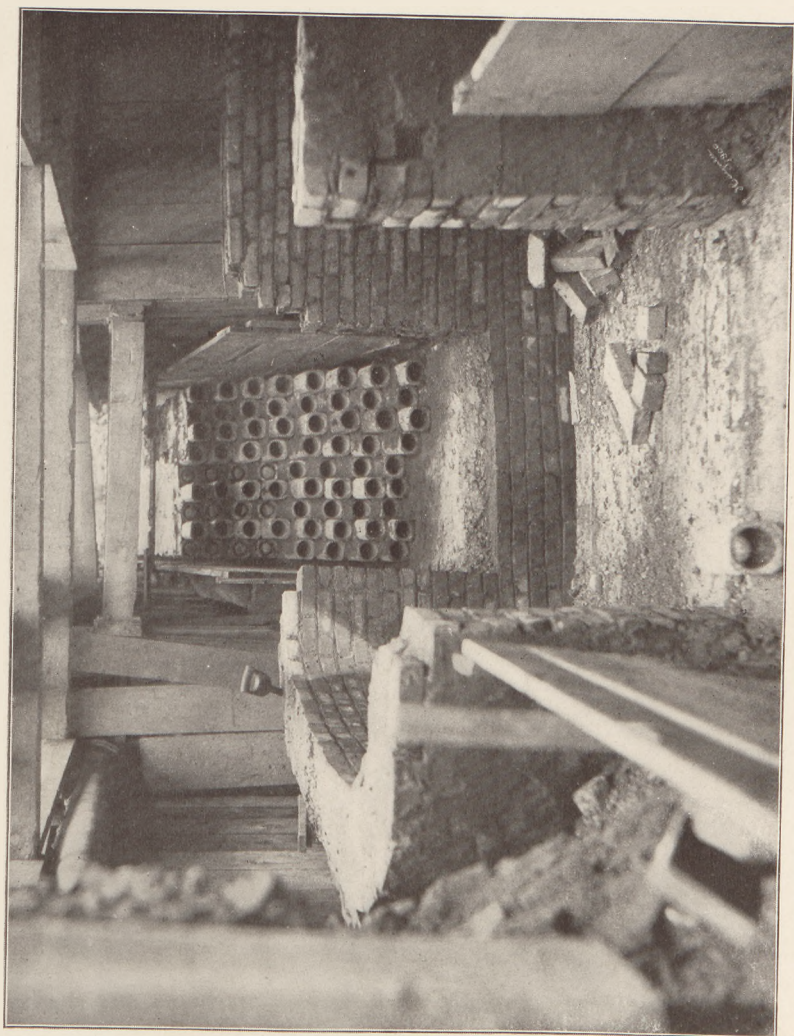
It has been found necessary during the past year to detail inspectors from the Overhead Division to assist the underground inspectors, owing to the very large increase in this character of work, and on this account the overhead inspection at times has been unavoidably crippled. On account of the probable increase in underground construction the coming season, and in order to give the overhead construction the attention which it requires, additional inspectors are necessary to successfully carry out the provisions of the law.

Occasionally a wire may be found over a street in the prescribed district, which in most cases is where a temporary location has been granted pending arrangements to provide means of communication in some other way. The Low Tension Wire Association have been given temporary cable locations over a few of the streets; but same are being removed as fast as underground services are completed.

It has been found necessary to cut and remove a number of wires of one company on account of the dangerous condition in which the wires were allowed to remain. This was only done after repeated and ineffectual attempts to have defects corrected. Since then a reconstruction of the entire overhead system of this company has been commenced, and work is progressing in an approved manner.

During the past year a marked improvement has been made in the pole line construction, fewer accidents having occurred to workmen required to handle the wires than in any previous year since the Wire Department was created. This is no doubt due in a large measure to the supervision by the Wire Department of all new work and improvements in old construction made by the companies at the request of the Wire Department.

The City has been divided into districts, and an inspector assigned to and held responsible for the condition of the wires in this district. This proves to have been a great help in keeping the construction in good condition, as the inspectors early familiarize themselves with the condition of the streets. The inspectors are required to go over their entire district once in four or five weeks, and consequently they are quick to notice any changes that may have been made in the wiring since their previous inspection. Any defects noted are reported and the interested parties at once notified from this office of the defect, which notice in most cases receive prompt attention, the Wire Department being notified of the action taken on same, and it is found usually that repairs have been made in a satisfactory and approved manner.



MASSACHUSETTS T. & T. CO. CONDUIT ON FRANKLIN STREET.

Plate No. 2.

The matter of approving pole locations which would be satisfactory to the petitioner, and at the same time offer as little objection to the abutters on the street as possible has been given a great deal of attention by this Department, and I am pleased to say that the system adopted seems to meet all the requirements, at the same time benefiting the interested parties.

When a company is desirous of setting poles on any of the public streets, avenues, etc., an employee of this Department accompanies their engineer, and together the least objectionable locations are selected, the exact location being noted, and a record of same kept in this office. After the petition of the company to the Board of Aldermen, has been granted and the poles set, a re-measurement is taken to determine if any changes have been made, as for unforeseen reasons it is at times found necessary to make changes, varying in distance from one to ten feet, due frequently to ledges, water, gas, and other pipes, or for other reasons which were not apparent at the time of the first survey. This arrangement seems to be most satisfactory, and fewer complaints have been received from citizens regarding poles on the streets, which, in the outlying districts, is a necessity, and will be for some time.

Every effort is being made to separate the low from the high-potential wires so as to reduce the danger to linemen who are obliged, owing to the nature of their work, to come in contact with the same. In order to successfully carry this out it has been necessary to erect two lines of poles, one on each side of some of the streets; when this cannot be done, a separation is required when it is possible, of forty inches. I will add that the officials of the leading companies, realizing the importance of this step, have rendered this Department every assistance possible to carry this out to a successful conclusion.

A survey is being made to determine the exact location of every pole in the limits of the City used for the support of telegraph, telephone, fire-alarm, police, electric light, and other wires. This is a difficult task and is one which has never before been attempted to my knowledge. It is estimated that there are about 20,000 poles standing in the streets at the present time, not including the poles of the Boston Elevated Railway Company, used for the support of trolley wires. Of the location of these poles there is no correct record. This work is being carefully done and a watchful care kept of removals, renewals, changes, etc., and a record of the same kept on atlases and books provided for



this purpose, so that it will be possible at a moment's notice to give the ownership, location, and condition of any pole of which information is desired ; a thing very necessary on account of the growing number of inquiries which are made almost daily.

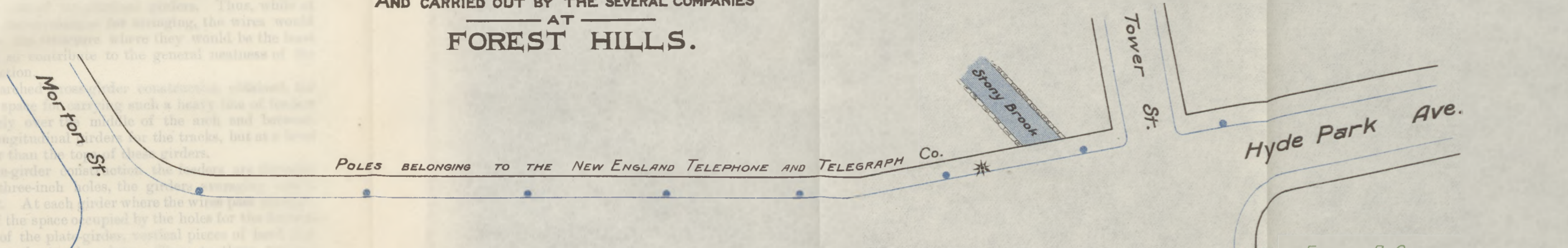
I submit with this report plans and photographs showing some of the streets of the City on which there are poles supporting heavy lines of wire. With others, a very noticeable change and improvement has been made on Washington street, at Forest Hills, request having been made by some of the companies for additional pole locations owing to the widening of the street at this point. On looking over the ground it was found that there were forty poles standing in a space of five hundred feet or less. Upon consultation with the several companies owning the poles, each using a type of their own, they readily agreed to combine and accept the plan suggested by this Department, so that to-day where there were forty poles, owned by five or six different companies, there are now but sixteen poles owned by two companies which accommodate the wires of all, and while the service of these companies has in no way been impaired, the appearance of the street has been very much improved.

There are many poles now standing in the streets which have been abandoned by the owners, so far as their wires are concerned, but are occupied by other companies ; consequently the owners cannot remove them, and yet they are required to keep them in a safe and satisfactory condition. This seems unjust, and some means should be devised whereby the responsibility should be assumed by some one of the companies occupying the poles when the original owner is desirous of surrendering them to another.

Iron lamp-posts, which have for many years been in use, to support arc-lights for street lighting, are being replaced by approved wooden posts. This style of post is being used by the Brookline Gas-Light Company and the Charlestown Gas and Electric Company in their respective districts, so that it is reasonable to expect that in a short time none of the old pattern will be in use in any part of the City. The Boston Electric Light Company were the first to use the new pattern posts, and the absence of accidents to linemen and trimmers in their employ shows it to have been a wise move.

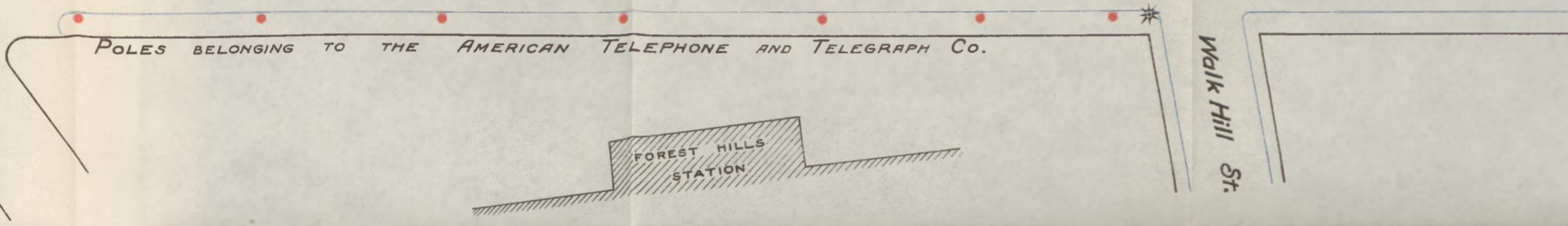
In the streets in which the elevated structure has been built by the Boston Elevated Railway Company, the structure has been utilized for the carrying of heavy lines of feeder wires required for the operation of the surface car lines. The feeder wires have been placed on the structure with a

**CITY OF BOSTON**  
**WIRE DEPARTMENT**  
 IMPROVEMENTS SUGGESTED BY THE  
 — COMMISSIONER OF WIRES —  
 AND CARRIED OUT BY THE SEVERAL COMPANIES  
 — AT —  
**FOREST HILLS.**



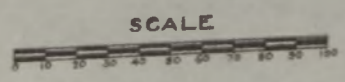
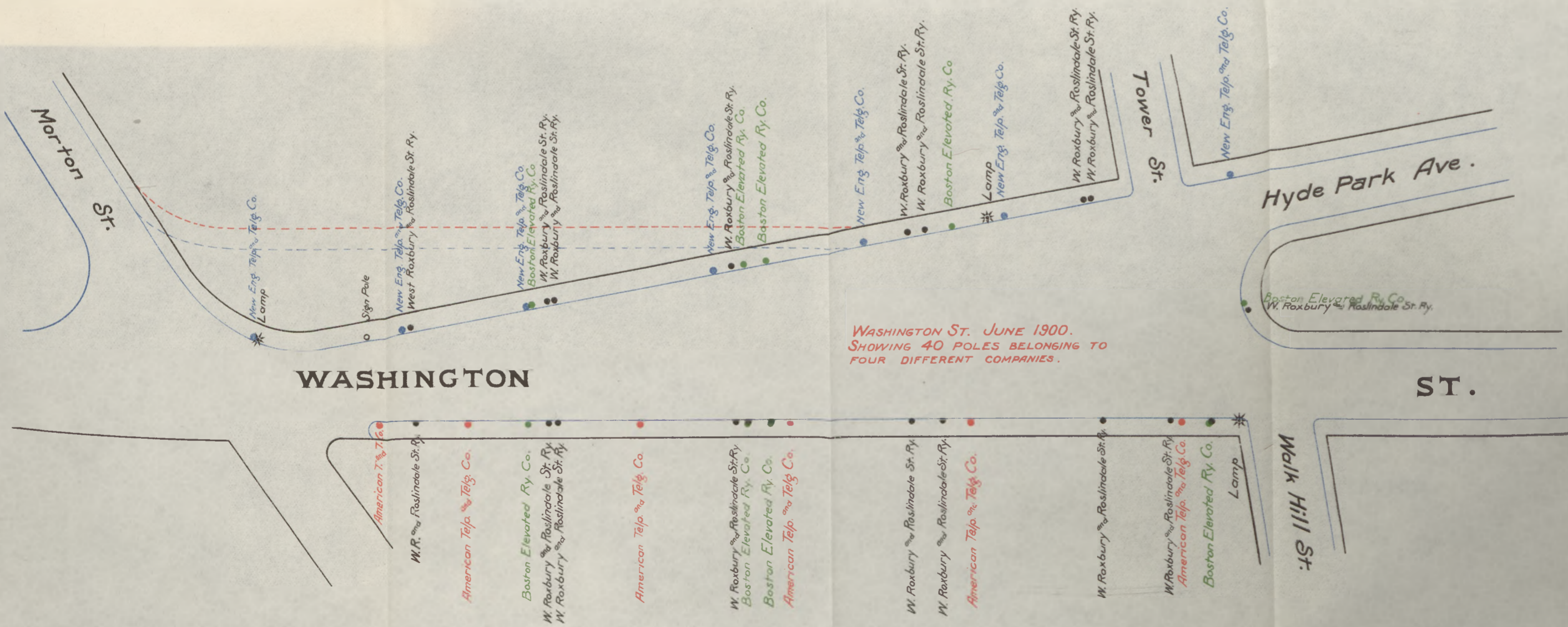
**WASHINGTON**

*WASHINGTON ST. DEC. 31st. 1900.  
 IMPROVED, SHOWING 16 POLES  
 BELONGING TO TWO COMPANIES  
 WITH THE EXCEPTION OF ONE POLE.*



**WASHINGTON**

*WASHINGTON ST. JUNE 1900.  
 SHOWING 40 POLES BELONGING TO  
 FOUR DIFFERENT COMPANIES.*



JAMES T. BALL, DRAUGHTSMAN.

view of securing the safest construction possible in relation to the structure and such other wires and fixtures as are used for the operation of both elevated and surface cars, *i.e.*, trolley wires, third rails and third-rail feeders.

The feeder wires are mostly 1,000,000 c.m. in size, and their insulation consists of a covering of three layers of braiding filled with insulating compound.

Owing to the changing type of construction used for the elevated structure, two distinct methods of supporting the wires had to be used.

Where plate cross-girders were used three (3) inch holes were drilled on six centres in the middle of the cross-girder, and so situated that the wires would come in the space between the two pair of longitudinal girders. Thus, while at a considerable inconvenience for stringing, the wires would be placed upon the structure where they would be the least obtrusive, and so contribute to the general neatness of the whole construction.

Where the arched cross-girder construction obtained, the only available space for carrying such a heavy line of feeders was immediately over the middle of the arch and between two pairs of longitudinal girders for the tracks, but at a level slightly higher than the tops of these girders.

In the plate-girder construction the feeders are threaded through the three-inch holes, the girders averaging nearly fifty feet apart. At each girder where the wires pass through, and outside of the space occupied by the holes for the feeders, on both sides of the plate-girder, vertical pieces of hard pine are bolted securely to the plate. Then, to these vertical wood pieces are fastened 3-inch by 3-inch cross-arms placed in proper relation to the horizontal row of holes. These cross-arms alternate on each side of the cross-girders with each successive horizontal row of holes, this being necessary to give working room between the cross-arms for the proper placing of the insulating supports, it being remembered that the centres of holes are only six inches apart.

The wood cross-arms are used to give an electrically safer support for the insulator which carries the wires, and at the same time to give a support which will carry the wire through the three-inch holes in the plate girder, clear and independent of the sides of the hole.

A supporting porcelain insulator is screwed fast to the top of the cross-arm and so placed that it holds the wire in the centre of the hole in the girder, thus precluding the danger of the wire coming in contact with the ironwork, or sides of

the hole. As an additional safeguard, a hardwood sleeve, split and about five inches in length and treated with an insulating compound, is fastened about the feeder wire at the point where the wire passes through the three-inch hole, thus avoiding any chance for abrasion to the insulation of the wire even should any mishap occur to the main support.

To avoid putting any other but a vertical strain upon the insulating supports just described, in order to hold the wire tight and keep slack out of the sections as much as possible, dependence must be had upon the method of anchoring the wire at the ends and at long intervals in the line.

To meet the severe strain which a 1,000,000 c.m. wire would necessarily put upon any kind of insulating anchor appliance, an entirely safe insulator and strong anchor appliance is made of two properly shaped blocks of lignum vitæ wood, held in tandem with iron straps, which are bolted together through the centres of the wood. The feeder wire is wound around in the groove of one of the lignum vitæ blocks and there fastened, and in a similar manner a heavy galvanized iron guy-wire, or specially placed wrought-iron clamp is placed in the groove of the other block and this connected with a clamp or other fixture held securely to the cross-girder.

A double insulation of the very highest strength is thus secured.

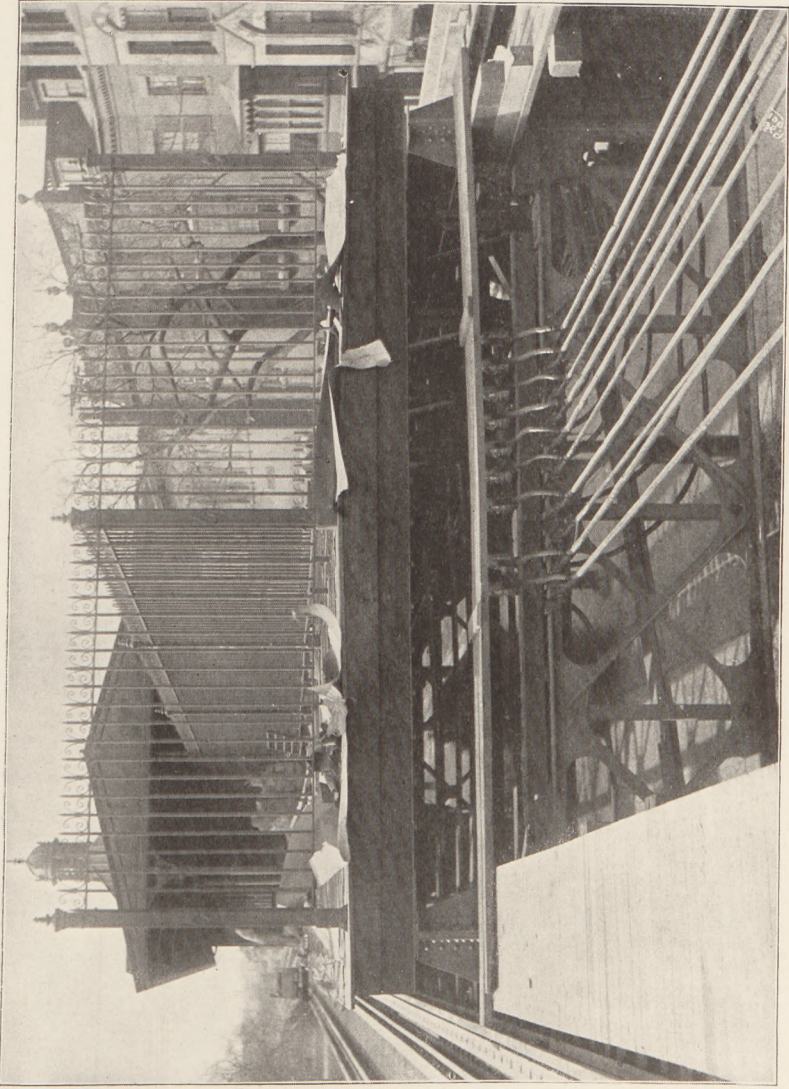
The constructions used for the support of the wires on the arched cross-girder of the structure is in effect, and it might be said, in fact, the same as is in common practice on heavy pole line feeder construction, *i.e.*, wood cross-arms, locust-pins, and petticoated glass insulators of the "Jumbo" type, the only difference being in the method of holding the cross-arms in place.

There are a large number of wires over some of the principal streets of the city, suspended during the late war, for the purpose of supporting flags. These now are seldom used, if at all, for the purpose for which they were originally intended, and probably are never examined to determine their condition. Consequently there are possibilities of serious results, in case of their falling on to trolley wires or on to the streets. These should soon be removed by the owners, who have been directed so to do. When it is found advisable to hang flags or anything of a like nature over the streets I think a hemp or manila rope would answer this purpose, and in case of its falling there would be but little danger of serious results.



BOSTON ELEVATED STRUCTURE, WASHINGTON STREET, AT W. NEWTON STREET.

(Showing method of stringing cables).



BOSTON ELEVATED STRUCTURE, NORTHAMPTON STREET STATION.

(Showing method of anchoring cables.)

## UNDERGROUND WORK.

Although the district prescribed for the removal of overhead wires during the year 1900 was much smaller than any previous year, yet there was more underground work done than ever before in one year.

The falling off in cables is due to the fact that the Boston Electric Light Company during the year 1899 connected up their L Street Station drawing cable amounting to over 1,200,000 feet.

While the accumulation of illuminating and other explosive gases cannot be wholly prevented, yet with the present system of inspection, and the prompt action of the Gas Company in seeking for and stopping the leaks when notified of their existence, through the presence of gas in the man-holes there was but one explosion during the past year. There have been eighteen (18) such explosions since the organization of the Wire Department; the greatest number in any one year being six (6), and one year there was none.

From the ducts surrounded by concrete, and the conductors contained therein, little trouble need be apprehended; but where the iron ducts for service connections and the solid tube system are laid in the earth, without the protection of concrete, they are exposed to and receive injuries that often lead to results that may at times prove serious.

Great care is exercised by this Department in the supervision of underground electrical construction to provide ample separation between the ducts and gas, water, and other pipes that are met with underground, and no difficulty is experienced in doing so; but as this Department can exercise no control over the operations of the employees of other departments and private contractors engaged in excavating the streets, injury to this class of conduits and the conductors they contain, and contact between them and other conducting material, are too frequent for the public good.

The solid tube system depends very largely on the earth for its stability and reliability, and the earth should not be removed from under any portion of it if it can be avoided; but as it cannot be, the greatest care should be taken to give it proper support and to maintain its alignment; but this is not always done. The tubes of this system are twenty (20) feet in length, and are connected together by cast-iron junction boxes that are halved longitudinally and held together by screws; they contain flexible conductors that join those in each consecutive tube together and are filled with an insulating compound. As the tubes are not screwed into these

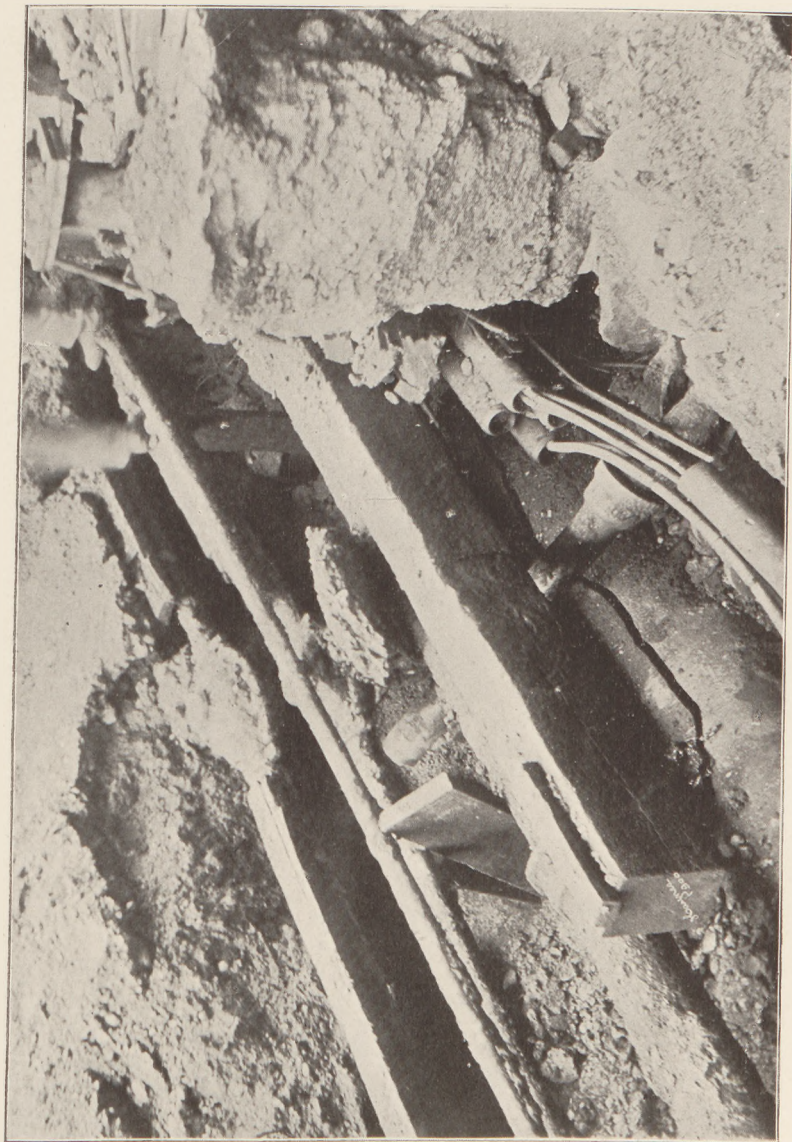
boxes, should the earth be removed from under them for any considerable distance each side of them unless rigidly supported in some way the tubes pull out, the conductors are severed or are brought in contact with the tube or box turning them into a conductor, and should the tube at any point be in contact with gas or water pipes current would be, and in a great many cases has been, carried into buildings causing more or less damage. Should the service ducts containing high potential wires be brought in contact with the water or gas pipes in like manner, and should the insulation of the wires fail, in addition to the danger from fire there would be that of injury to persons as well.

Since the organization of this Department there have been twelve (12) cases where a dangerous amount of current has been carried into buildings over the pipes supplying them with illuminating gas, four (4) of which occurred during the year 1900. There have been two cases where holes have been burned through the gas mains in the street where they were in contact with the tubes of the Edison system. There have been no cases reported where the electrical ducts and tubes have been found in contact with water pipes, which is due, no doubt, to the fact that the latter are laid below the frost line, while gas pipes and electrical conduits and ducts are not, except in rare cases when it is necessary to avoid obstructions, so the danger resulting from contact between water pipes and electrical conduits is very small. Nevertheless, the danger exists, and it is one in a great measure beyond the control of the Wire Department; but as the fires from this cause have almost steadily increased since 1894, thirty-three per cent. (33%) of the whole having occurred during 1900, it can at least sound a note of warning as follows:

All persons engaged in excavating the streets who wilfully or negligently cause any underground electrical duct to rest upon or against a gas, water, or metallic drain pipe, endangers the lives and property of the people of the City of Boston, and they should be held strictly responsible for their treatment of all such ducts and conduits by ordinance or act of the Legislature, and it seems to me that the time has arrived for more stringent regulation of the methods of digging around, above and below the electrical conduits laid under the surface of the streets.

Of the fact that fires are most likely to occur from this cause there is no doubt, as it is well known to this Department that the system of conduits are in electrical contact





DAMAGED CONDUITS, CORNER BOYLSTON AND TREMONT STREETS.

Plate No. 3.

with the gas-pipe systems, but at what points, and how many, it is unable to state. It may now be asked, Is there any means of preventing fires from this cause that the owners and occupants of buildings can avail themselves of? In reply it can be said that there are three: An insulator placed in the service gas-pipe near the point where it enters the building; or perfect separation of the gas from the water and sewer pipes; or connecting the water, gas, and sewer pipes together electrically where they enter at the same point; of these three plans the first is decidedly the best, for one, if not both of the other two would not prevent the charging of the pipes to a dangerous potential above that of the earth that might cause serious injury to persons.

EXTERIOR DIVISION.

*Table showing the Overhead and Underground Work from February 1, 1900, to January 31, 1901.*

Permits granted by the Board of Aldermen to set poles . . . . .	222
Permits granted by the Board of Aldermen to remove poles . . . . .	65
Number of poles set . . . . .	1,116
Number of poles removed . . . . .	215
Wire removed by Wire Department, feet . . . . .	272,150
Fixtures removed by Wire Department . . . . .	535
Defect notices sent out . . . . .	2,147
Defects included in these notices . . . . .	5,041
Defects corrected . . . . .	4,270
Number of fuse inspections . . . . .	1,842
Notices of work received . . . . .	1,542
Amount of wire removed by owners as reported, feet . . . . .	20,160

Permits to set and remove poles were granted to the following companies:

Boston Fire Department.	American Telephone and Telegraph Company.
Boston Electric Light Company.	New England Telephone and Telegraph Company.
Brookline Gas Light Company.	Charlestown Gas and Electric Company.
Postal Telegraph Cable Company.	Boston Elevated Railway Company.

*Underground Construction.*

Year 1900 . . .	167,766	feet of conduit construction.
1899 . . .	123,566	“ “ “
Increase . . .	44,200	“ “ “
Year 1900 . . .	851,104	feet of duct laid.
1899 . . .	765,484	“ “
Increase . . .	85,620	“ “
Year 1899 . . .	1,613,871	feet of cable drawn.
1900 . . .	784,488	“ “ “
Decrease . . .	829,383	“ “ “
Year 1900 . . .	582	manholes built.
1899 . . .	535	“ “
Increase . . .	47	“ “
Year 1900 . . .	1,035	services connected.
1899 . . .	895	“ “
Increase . . .	140	“ “

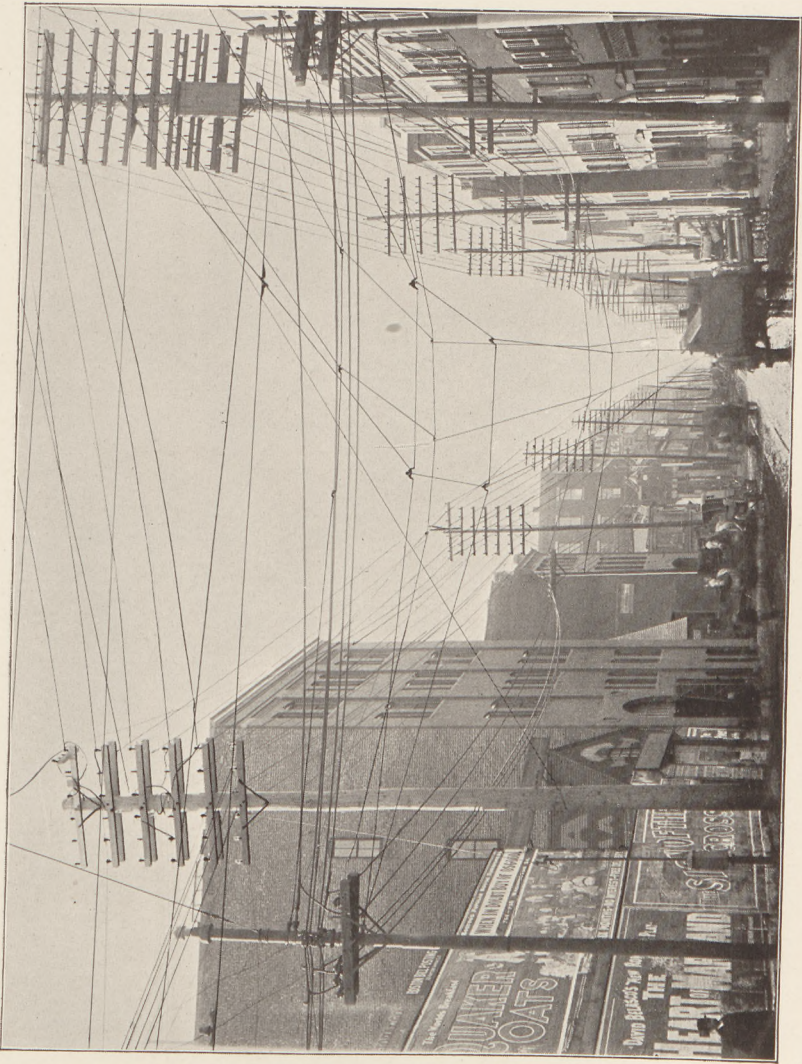
The following is a list of companies and individuals doing underground work during the year 1900.

*For Electric Light and Power Purposes. (High Tension.)*

Boston Electric Light Company.  
 Boston Elevated Railway Company.  
 Brookline Gaslight Company.  
 Boston Terminal Company.  
 Boston and Maine Railroad Company.  
 Edison Electric Illuminating Company.  
 Mt. Hope Cemetery.  
 Park Department (City of Boston).  
 Public Institutions (City of Boston).  
 Church Green Electric Light and Power Company.  
 Suburban Light and Power Company.

*For Telephone, Telegraph, Signalling and other Purposes.*

New England Telephone and Telegraph Company.  
 Massachusetts Telephone and Telegraph Company.  
 Fire Alarm Branch (Boston Fire Department).  
 Police Signal Service (Boston Police Department).  
 Boston Low Tension Wire Association.



HARRISON AVENUE, SOUTH FROM DOVER STREET.

(Underground District, 1900.)

Boston Automatic Fire Alarm Company.  
 Boston District Messenger Company.  
 Mutual District Messenger Company.  
 Holmes Electric Protective Company.  
 Postal Telegraph Cable Company.  
 American Telephone and Telegraph Company.  
 Western Union Telegraph Company.  
 Park Department (City of Boston).  
 New England Women's Hospital.  
 Mixer Brothers.  
 R. H. White Company.  
 D. Webster King.

New conduits have been laid in all of the streets prescribed by the Commissioner of Wires, in which wires shall be placed underground during the year 1900, viz. :

Street	From	To
Harrison ave.	Dover	Northampton
Dover	Albany	Tremont
E. and W. Concord	Albany	Shawmut ave.
Wareham	Albany	Malden
Northampton	Albany	Shawmut ave.

In that portion of the City north of Dover street, or the original underground district, one hundred thirteen (113) streets have been opened during the year, by the different companies, for the purpose of building new conduits, or enlarging their old ones. Business having increased so much during the year as to make this necessary. Besides these, something like one hundred twenty-two (122) different streets have been opened for laying new conduits in the rest of the City and suburbs, not included in these two districts.

The Department has electrically approved fourteen hundred thirty-two (1,432) permits for underground work during the year, and thirty-two hundred eighty-six inspections have been made on the same.

The summary of the work of all the companies, both high and low tension, for the year, is as follows:

167,766 feet of conduct completed.  
 851,104 feet of duct laid.  
 784,488 feet of cable drawn in ducts.  
 1,035 service connections made.  
 582 manholes built.  
 24 distribution boxes set.

The following is a descriptive report of the underground work of the various companies for the year ending January 31, 1901.

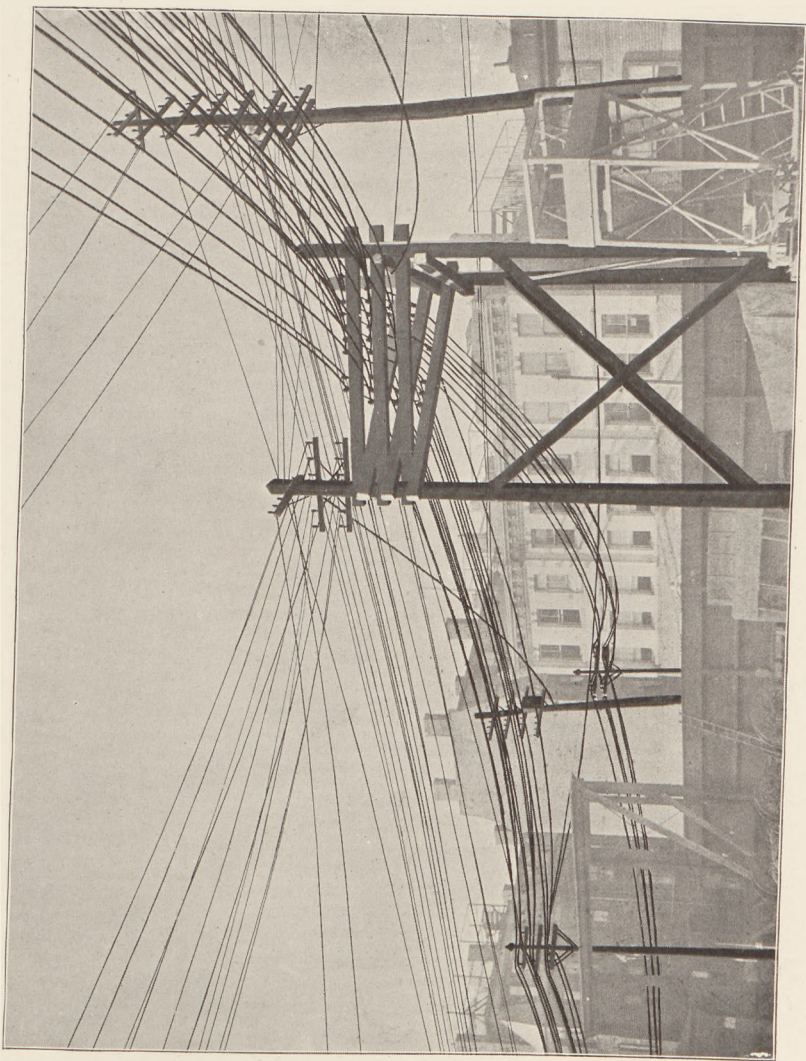
The Boston Electric Light Company, during the year 1900, has laid new conduits in the following streets in the City limits:

Street	From	To	No. of Ducts	Type
Adams sq.	Cornhill	Devonshire	1	Clay
Beacon	Massachusetts ave.	Commonwealth ave.	4	Cement lined
Brattle	Franklin	Washington	4	"
Bennett	Washington	Ash	2	"
Berkeley	Boylston	Newbury	4	"
Bowdoin	Cambridge	No. 18	1	Clay
Broadway ext.	Curve	Albany	4	"
Carver	Eliot	Townsend pl.	1	Cement lined
Central whf.	Atlantic ave.	Sears	2	"
Columbus ave.	Morgan	Massachusetts ave.	4	Cement lined
Columbia rd.	Marine pk.	Sixth	2	"
Charles	Charlesbank		1	Wooden
Chambers	Ashland	No. 133	1	Clay
Concord	Albany	Shawmut ave.	2-4	Cement lined
Dartmouth	Columbus ave.	Harwich	4	"
Dorchester ave.	Summer	Congress	12	"
East	Atlantic ave.	East-st. pl.	2	"
Edinboro'	Beach	No. 32	2	"
Edinboro'	Essex	No. 10	2	"
Fairfield	Boylston	Commonwealth ave.	2	Cement lined
Harrison ave.	Dover	Northampton	4	"
Ipswich	Boylston	Landsdowne	4	"
Kingston	Essex	Bedford	2	"
LaGrange	Washington	Tamworth	2	"
Lincoln	Kneeland	Beach	2	"
Lincoln	Bedford	No. 27	2	"
Marine pk.	South Boston		1	Wooden
Mountford	Beacon	No. 34	1	Cement lined
Nassau	Ash	Harrison ave.	1	Cement lined
Northampton	Albany	Shawmut ave.	6	"
Newton (E.)	Harrison ave.	Private way	1	Clay
Oliver pl.	Essex	No. 14 Oliver pl.	1	"
Oxford pl.	Harrison ave.	No. 4 Oxford pl.	1	"
Private way	Aberdeen	Audubon way	1-2	"
State	Chatham row	Commercial	4	Cement lined
Summer-st. ext.	A	B	1	"
Summer-st. ext.	Fargo	B	2	"
Tremont	LaGrange	Boylston	5	"
Utica	Utica pl.	Beach	2	Clay
Utica	Kneeland	Utica pl.	1	Cement lined
Waltham	East of Harrison ave.		2	Clay
Warren ave.	Berkeley		2	Cement lined
Wareham	Harrison	Albany	2	"
Winthrop sq.	No. 15		2	Clay

This Company has used paper and rubber insulated cables in sizes — Nos. 0-00-0000 and 6.

The work for the year comprised :

- 30,674 feet of conduit completed.
- 107,355 feet of duct laid.
- 339,005 feet of cable drawn.
- 302 services connected.
- 166 manholes built.
- 70 underground transformers installed.



FEEED WIRES FROM BOSTON ELEVATED RAILWAY STATION, HARRISON AVENUE.

(Underground District, 1900.)

Plate No. 7.

The Boston Elevated Railway Company during the year 1900 has laid new conduits in the following streets in the City limits :

Street	From	To	No. of Ducts	Type
Battery	Hanover	Commercial	6	Clay
Beacon	Chestnut Hill ave.	Brookline line	6	"
Beaton	St. Mary's	Aberdeen	8	"
Broadway, ext.	Curve	Albany	5	Wrought iron
Chestnut Hill ave.	Englewood ave.	Brookline line	10	Clay
Huntington ave.	Heath	Brookline line	8	"
Newton (E.)	Washington	Harrison ave.	3	"
Shawmut ave.	W. Springfield (S.)		8	"
Springfield (W.)	Washington	Shawmut ave.	24	"

The feeder cables drawn in during the year are paper, fibre, and rubber insulated ; sizes, 1,000,000 and 500,000 circular mills.

For the return system, both weather-proof, insulated, and bare cables are employed.

Terminal poles have been established at the following places :

Opposite No. 896 Huntington avenue, near Brookline line.

Shawmut avenue, between West Springfield street and Massachusetts avenue.

Elevated structure, Washington, opposite West Springfield street.

Franklin street, between Braintree and Lincoln streets, Allston.

Braintree street, near Franklin street, Allston.

The work for the year comprised :

3,710 feet of conduit completed.  
 31,860 feet of duct laid.  
 58,887 feet of cable drawn.  
 10 services connected.  
 18 manholes built.

Boston Terminal Company has laid no new conduits during the year, but have drawn into their old ducts 11,657 feet of rubber insulated cable, sizes six and twelve, one and two conductors.

Brookline Gas-Light Company has laid new conduit in the following street within the City limits :

Street	From	To	No. of Ducts	Type
Jersey	Boylston-st. ext.	Audubon road	4	Cement-lined

This Company has used rubber insulated single conductor cables, sizes Nos. 2, 4, and 6.



The work for the year comprised :

860 feet of conduit completed.  
 4,995 feet of duct laid.  
 9,709 feet of cable drawn.  
 9 services connected.  
 5 manholes built.

Mt. Hope Cemetery, during the year, has opened the following streets for the purpose of building new conduits :

Street	To	No. of Ducts	Type
Walk Hill	Superintendent's house, Mt. Hope Cemetery	1	Clay
Walk Hill	Insane Department, Pierce Farm	1	"

The work for the year comprised :

1,345 feet of conduit completed.  
 1,339 feet of duct laid.  
 3,272 feet of cable drawn.  
 2 services connected.  
 2 manholes built.

Park Department (City of Boston) has opened the following streets for the purpose of laying new conduits :

Street	From	To	No. of Ducts	Type
Morton	Franklin Park	Superintendent's house	1	Wrought iron
Canterbury	Franklin Park	Greenhouse	1	"

The work for the year comprised :

1,470 feet of conduit completed.  
 1,452 feet of duct laid.  
 42,549 feet of cable drawn.  
 6 manholes built.

Public Institutions (City of Boston) have done some work of this nature at Austin and Pierce farms, Dorchester, and at Deer Island, Boston Harbor.

The work for the year comprised :

1,687 feet of conduit completed.  
 1,824 feet of duct laid.  
 600 feet of cable drawn.  
 2 services connected.  
 7 manholes built.

EDISON ELECTRIC ILLUMINATING COMPANY.

Drawing-in system.

This company has laid new conduits in the following streets in the city limits during the year:

Street	From	To	No. of ducts	Type
A	Congress	Private way east	12 and 24	Clay
Atlantic ave.	Pearl	Dewey sq.	30	"
Atlantic ave.	at Edison station	90 and 120	"	"
Belvidere	St. Cecilia	Mass. ave.	6	"
Boylston	Bumstead ct.	Head pl.	30	"
Boylston	Tremont		6	"
Bumstead ct.	Edison station	Boylston	8	"
Congress	A	Congress-st. bridge	12	"
Dewey sq.	Summer	Atlantic ave.	30	"
Joy	Cambridge	Myrtle	6	"
Kneeland	Lincoln	Albany	9	"
Lincoln	Kneeland	Summer	9	"
Mass. ave.	Belvidere	Norway	6	"
St. Cecilia	Scotia	Belvidere	6	"
Summer	Washington	Chauncy	12	"
Summer	Chauncy	Dewey sq.	30	"
Tremont	opp. Mason		6	"
Winter	Washington	Tremont	12	"

The cables drawn in the above conduits are rubber insulated, and of the following sizes: Positive and negative are of 1,000,000 circular mills, and the neutral of 350,000 circular mills. The pressure wire cables are rubber insulated and contain three conductors.

The work for the year comprised:

- 8,724 feet of conduit completed.
- 125,831 feet of duct laid.
- 40,327 feet of cable drawn.
- 32 manholes built.

SOLID SYSTEM.

The following streets have been opened for the purpose of laying three-wire Edison tubing:

Street	From	To	Kind
Albany	Bristol	Private way,	
Ashburton pl.	Somerset	Bowdoin	No. 200 Main
Atlantic ave.	Beach	No. 17	" 350 "
Avon	Washington	Chauncy	" 350 "
Bay State road	Raleigh	Deerfield	" 350 "
Bay State road	Deerfield	Granby	" 350 "
Beacon	Park	Tremont	" 350 "
Beach	Albany	Lincoln	" 350 "
Bedford	Washington	Chauncy	" 350 "

Street	From	To	Kind.
Belvidere	St. Cecilia	Massachu- setts ave. No. 350	Main
Brookline ave.	Commonwealth ave.	No. 7	350 "
Bristol	Albany	Fire Head- quarters	" 200 "
Canton (W.)	Washington	Shawmut ave.	" 350 "
Court	Pemberton sq.	Court sq.	" 350 "
Church	Tremont	Melrose	" 350 "
Dedham (W.)	Washington	Tremont	" 350 "
Derne	Bowdoin	Hancock	" 350 "
East	South of Engine House	No. 7	" 200 "
Fulton pl.		North	" 350 "
Grove (N.)	No. 10	City Morgue	" 200 "
Harrison ave.	Malden	Bristol	" 350 "
Hereford	Beacon	Boylston Nos. 200 and 350	" "
Hemmenway	Boylston	Norway	No. 350 "
Huntington ave.	Exeter	No. 66	" 350 "
Huntington ave.	Opp. Hotel Oxford		" 200 "
Irvington	Huntington ave.	Private way	" 200 "
Joy	Myrtle	Mt. Vernon	" 350 "
Lincoln	Kneeland	Summer	" 350 "
Milk	India	Pearl	" 350 "
Myrtle	Hancock	S. Russell	" 350 "
Newbury	Mass. ave.	Hereford	" 350 "
Newton (W.)	Opp. No. 185		" 350 "
Norway	Mass. ave.	Hemmen- way	" 350 "
Pemberton sq.	Somerset	Tremont	" 350 "
Salem	Parmenter	Engine House No. 8	" 200 "
School	Tremont	City Hall ave.	" 350 "
Shawmut ave.	W. Canton	Chemical House No. 4.	" 350 "
Somerset	Ashburton pl.	Beacon	" 350 "
South	Kneeland	Summer	" 350 "
Summer	Washington	Devonshire	" 350 "
Van Rensselaer pl.	Tremont	Rear No. 98 Boylston	" 200 "
Warren ave.	Clarendon	Engine House No. 22	" 200 "
Washington	Winter	Summer	" 350 "
Washington	Pelham	W. Canton	" 350 "
Winter	Tremont	Winter pl.	" 350 "

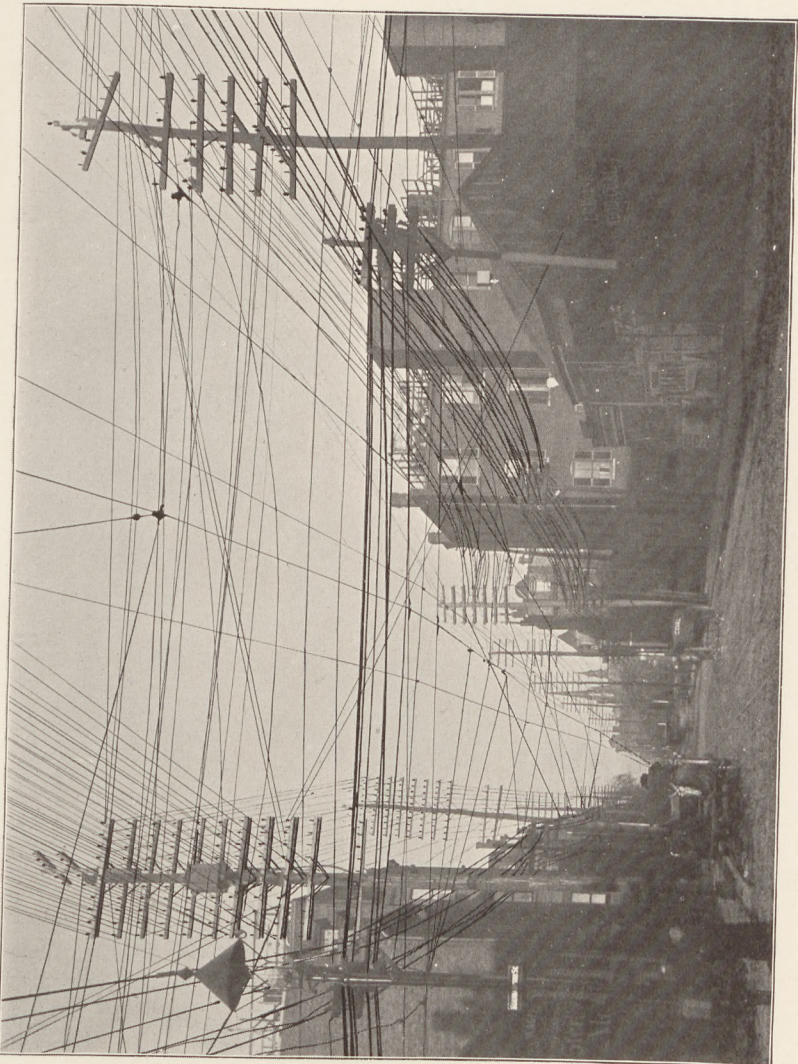
The work for the year comprised :

22,604 feet of main and feeder tubing.

11,532 feet of service tube.

283 service connections.

24 catch and feeder boxes.



HARRISON AVENUE, NORTH FROM NORTHAMPTON STREET.

(Underground District, 1900.)

Plate No. 8.

The Church Green Electric Light and Power Company has during the year done very little underground work, only having made one service connection of fourteen feet, and drawn eighteen feet of rubber insulated No. 4 cable into same.

The Suburban Light and Power Company has laid seventy-eight feet of pipe, and made but one service connection during the year; no cable drawn.

The Boston & Maine Railroad has done very little underground work this year, only having drawn fifty-five feet of rubber insulated cable into the old ducts, size No. 4, two conductors.

The New England Women's Hospital has laid five hundred twenty feet of new pipe during the year. No cable drawn.

The New England Telephone and Telegraph Company has laid new conduits in the following streets in the City limits:

Street	From	To	No. of Ducts	Type
Aberdeen	Beacon	Private way	2	Cement lined
Ashland (W. R.)	Washington	Brandon	4	Wooden
Arch	Summer	Franklin	15	Clay
Bay State road	Raleigh	Deerfield	1	Cable
Belvidere	W. Newton	Private way	2	Wrought iron
Bennington (E.B.)	Saratoga	Parkway	4	Wooden
Bennington (E.B.)	Porter	Parkway	5	Clay
Brandon (W.R.)	South	Roberts	4	Wooden
Brookline ave.	Beacon	Jersey	4	Clay
Brookline	Private way	Harrison ave.	2	"
Brookline ave.	B. & A. R.R. Bdge.		4	Wrought iron
Canton (W.)	Newland	Washington	2	Cement lined
Canton (E.)	Mystic	Washington	2	"
Cambridge	Bowdoin sq.	W. B. Bridge		
		8-12-14-15		Clay
Central ave. (Dor.)	River	Bridge	2	Wooden
Centre (W. R.)	South	LaGrange	4	"
Chandler	Berkeley	Cazenove	2	Clay
Chardon	Green	N. E. T. & T. Co. off	20	Cement lined "
Cook (Chs'n)	Medford	Bunker Hill	3	Clay
Congress	No. 293	Gilbert pl.	10	"
Columbus ave.	Yarmouth	Dartmouth	2	"
Columbus ave.	Berwick park	Holyoke	2	"
Columbus sq.	W. Newton, S. of	Massachusetts ave.	3	"
Columbus ave.	Berwick park	Pembroke	2	"
Columbia road	O	Second	1	Wooden
Concord (E.)	Harrison ave.	Albany	3	Clay
Dedham (E.)	Harrison ave.	Albany	2	"
Dorchester ave.	Mt. Washington av.		1	Wrought iron
Dudley	Alexander	Columbia road	4	Clay
Elm Hill av. (Rox.)	Warren	Seaver	3	"
Exeter	Marlboro'	Public Alley No. 418	2	"
Falmouth	St. Paul	Massachusetts ave.	2	"
Farnsworth	Congress	Rear of No. 338	2	"
Franklin	Pearl	Arch		
		3, 9, 15, 16, 18, 20		"
Gainsboro'	Huntington ave.	St. Stephens	2	"
Greenwich park	Columbus ave.	Private way	2	"

Street	From	To	No. of Ducts	Type
Harvard	Harrison ave.	Albany	2	Clay
Harvard (Dor.)	Washington	Blue Hill ave.	3	"
Harrison av. (Rox)	Dudley	Warren	6	"
Harrison ave.	Waltham	Malden	4	Cement lined
Holyoke	Columbus ave.	Private way	2	Clay
Hyde Park ave. (W. R.)	Tower	Hyde Pk. Line	6	Wooden
Jersey	Brookline ave.	Boylston	4	Clay
Jersey	Brookline ave.	Audubon road	4	"
Kneeland	South	Utica	3	"
Lincoln	South	Beach	1	Wrought iron
Malden	Washington	Mystic	2	"
Malden	Wareham	Albany	2	Clay
Marlboro'	Massachusetts av.	Charlesgate (E.)	3	"
Mystic	Malden	Norwich	2	Wrought iron
Newton (W.)	Washington	Newland	2	Clay
Newton (E.)	Harrison ave.	Private way	2	"
Newland	Draper's Lane	Trumbull	2	"
North sq.	Prince	North	1	"
Northampton	Chester pl.	West of Shaw- mut ave.	2	"
Pelham	Washington	Pelham pl.	2	Wooden
Pemberton sq.	Somerset	Court House	4	"
Roberts	Brandon	South	4	"
River	Washington	Central ave.	3	"
Scotia	St. Cecilia	No. 20	2	Clay
Shawmut ave.	Private way	W. Springfield	2	"
Sherborn	Commonwealth av.	Bay State road	3	"
St. Cecilia	Cambria	Scotia	2	"
St. Stephen	Massachusetts ave.	Private way	2	"
St. Germain	Massachusetts ave.	Private way	2	Cement lined
Staniford	Green	South Margin	2	Clay
South	Roberts	Centre	4	Wooden
Summer	at Dorchester ave. Bridge		3	Wrought iron
Springfield	Washington	Shawmut ave.	2	Clay
Tremont	Parker	Huntington ave.	4	"
Van Rensselaer pl.	Tremont		2	"
Washington	Walk Hill	Ashland	5	Wooden
Washington	Adams	Milton line	5	Clay
Washington	Ashland	Poplar	5	Wooden
Washington	Green	Walk Hill	8	Clay
Washington	Park	Eldon	4	"
Washington	LaGrange	Boylston sq.	1	Wrought iron
Yarmouth	Columbus ave.	Private way.	2	Clay

This Company has used lead covered, paper insulated cables of 3, 5, 10, 15, 20, 25, 30, 60, 80, 120, and 180 pairs in the different cables.

The work for the year comprised:

76,397 feet of conduit completed.  
 370,936 feet of duct laid.  
 196,036 feet of cable drawn.  
 265 services connected.  
 260 manholes built.



CORNER HARRISON AVENUE AND NORTHAMPTON STREET.

(Underground District, 1900).

Plate No. 9.

The Massachusetts Telephone and Telegraph Company during the year 1900 has laid new conduits in the following streets in the City limits:

Street	From	To	No. of Ducts	Type
Aldine	Atlantic ave.	Hathaway	1	Wrought iron
Broad	State	Franklin	16-18	Clay
Butler row	State		1	Wrought iron
Channing	Federal	Leather sq.	1	"
Congress	Water	State	1	Clay
Devonshire	Water	Spring lane	1	Wrought iron
Doane	at Broad		2	Clay
Franklin	Federal	India		
		12, 30, 40, 64, 72		"
Franklin	No. 185		10	Wrought iron
Federal ct.	Federal	No. 125 Federal		
		(rear)	2	"
Hawes	Congress	rear of No. 3	2	"
High	Pearl	Hartford pl.	2	"
India	Franklin	Opp. No. 54	2	"
Matthews	Federal	High	1	"
Milk	Pearl	Federal	16	Clay
Milk	Broad	Pearl	24	"
Milton pl.	Federal ct.	No. 12 High		
		(rear)	1	Wrought iron
Pearl	Milk	Atlantic ave.		
		8, 16, 36, 56		Clay
Post Office sq.	Pearl	Water	20	"
Private Way	Doane (rear)		2	Wrought iron
Spring lane	Devonshire	Private way	1	"
State	Washington	Broad	6-12	Clay
Wendell	Pearl	Batterymarch	40	"
Wendell	Batterymarch	No. 75	2	Wrought iron

This Company has used paper insulated cables of 10, 15, 20, 25, 30, 50, 60, 90, 100, 120, and 200 pairs.

The work for the year comprised:

8,060 feet of conduit completed.  
 149,993 feet of duct laid.  
 17,314 feet of cable drawn.  
 70 services connected.  
 58 manholes built.

#### BOSTON LOW TENSION WIRE ASSOCIATION.

This Association consists of the following companies: Boston Automatic Fire Alarm Company, Boston District Messenger Company, Mutual District Messenger Company, Holmes Electric Protective Company, Postal Telegraph-Cable Company, United Telegram Company, Western Union Telegraph Company and Stock Quotation Telegraph Company.

New conduits have been laid by the Association in the following streets in the City limits:



Street	From	To	No. of Ducts	Type
Beacon	Somerset	Mt. Vernon	1	Wrought iron
Dartmouth	Hotel Vendome	Ames Estate	2	"
Dartmouth	Commonwealth ave.	Ames Estate (rear)	1	"
Mt. Vernon	Beacon	State House	1	"

The cable used by this Association has been entered under the separate companies comprising the same.

The work for the year comprised :

1,126 feet of conduit completed.  
 1,906 feet of duct laid.  
 9 services connected.  
 3 manholes built.

Boston Automatic Fire Alarm Company has laid new conduits in the following streets during the year :

Street	From	To	No. of Ducts.	Type
Fayette	Bay	Pleasant	2	Clay
Oliver	Milk	Private Way	1	Wrought iron

This Company has used rubber insulated cable of 2, 12, and 19 conductors.

The work for the year comprised :

858 feet of conduit completed.  
 2,723 feet of duct laid.  
 1,534 feet of cable drawn.  
 8 services connected.  
 5 manholes built.

Boston District Messenger Company has drawn during the year 4,683 feet of rubber insulated cable of 2, 6, and 10 conductors, into the ducts of the Association.

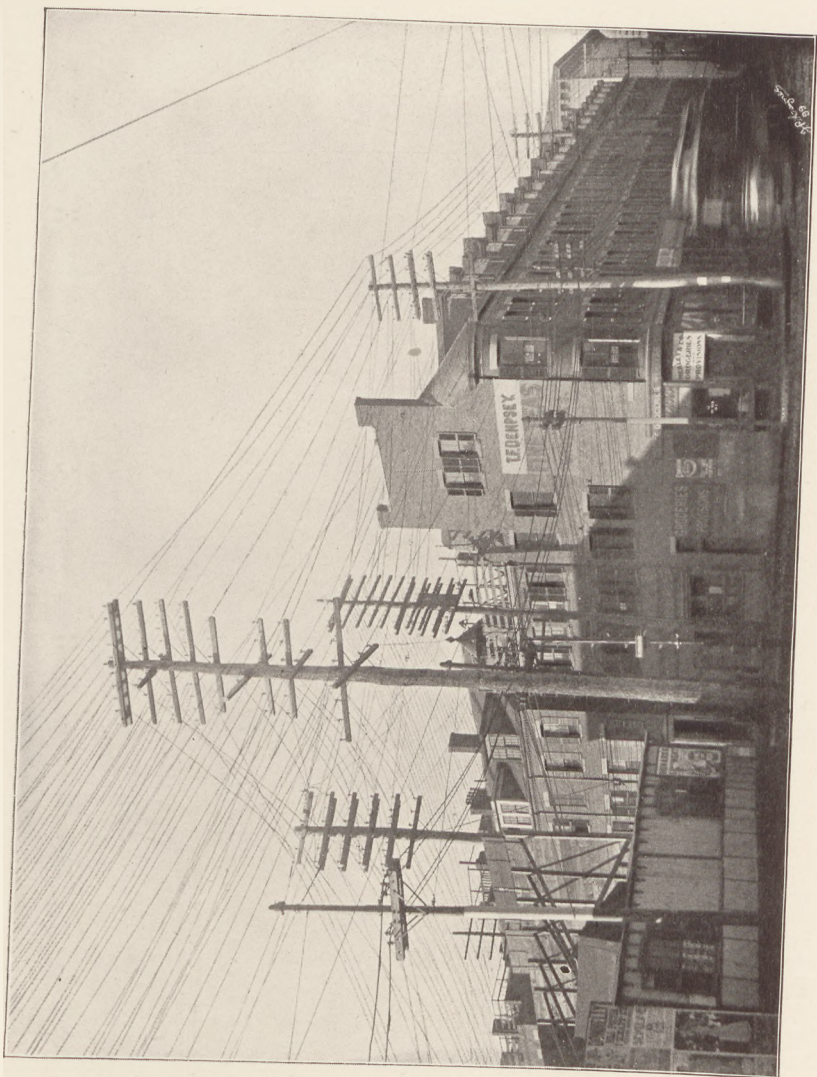
The Mutual District Messenger Company has drawn during the year 3,380 feet of rubber insulated cable of 4, 5, 6, and 10 conductors, into the ducts of the Association.

The Holmes Electric Protective Company has drawn during the year 2,087 feet of rubber insulated cable of 2, 4, 6, 12, and 16 conductors, into the ducts of the Association.

The Boston Electric Protective Association has been consolidated with the Holmes Electric Protective Company.

The Western Union Telegraph Company has laid new conduits in the following streets during the year :

Street	From	To	No. of Ducts.	Type
St. James ave.	Trinity pl.	Clarendon	1	Wrought iron
Trinity pl.	Stanhope	St. James ave.	1	"
Tufts	Lincoln	South	1	"



CORNER OF HARRISON AVENUE AND DOVER STREET.  
(Underground District, 1900.)

Plate No. 10.

This Company has used rubber and paper insulated cables of 4, 15, and 80 conductors, a portion of which was drawn into the ducts of the Association.

The work for the year comprised :

1,523 feet of conduit completed.  
 1,729 feet of duct laid.  
 4,837 feet of cable drawn.  
 6 services connected and 5 manholes built.

Postal Telegraph Cable Company has laid new conduits in the following streets during the year :

Street	From	To	No. of Ducts	Type
Congress	Gilbert pl.	Abutment wall	1	Wrought iron
Dartmouth	Hotel Vendome	Hotel Victoria	1	"
Dartmouth	Commonw'lth av.	Dartmouth (rear)	1	"

This Company has used paper-insulated cable of six conductors.

Work for the year comprised :

658 feet of conduit completed.  
 2,000 feet of duct laid.  
 1,000 feet of cable drawn.  
 18 services connected.  
 3 manholes built.

Police Signal Service of the Police Department of the City of Boston has laid new conduits in the following streets :

Street	From	To	No. of Ducts	Type
Dedham (E.)	Washington	Harrison ave.	1	Wrought iron
Dover	Shawmut ave.	Fay	1	"
Dover	Harrison ave.	Fay	1	"
Harrison ave.	at Waltham		1	"
Newton (E.)	Harrison ave.	Albany	1	"
Northampton	Harrison ave.	Washington	2-3	"
Shawmut ave.	Dover	Bradford	1	"
Marine park	Castle Island b'dge		1	"

During the year this Department erected seventeen iron posts, each of which supports a signal-box. These are connected with their own conduits or those of the New England Telephone and Telegraph Company. Rubber insulated cable of seven conductors has been used in all the underground work.

The work for the year comprised :

6,595 feet of conduit completed.  
 9,315 feet of duct laid.  
 30,783 feet of cable drawn.  
 20 services connected.  
 10 manholes built.

Fire-alarm branch of the Boston Fire Department of the City of Boston has laid new conduits in the following streets :

Street	From	To	No. of Ducts	Type
Albany	Dover	Bristol	2	Wrought iron
Albany	Wareham	East Dedham	1	"
Bristol	Albany	Fire Headquar- ters	2	"

During the year this Department erected ten lamp-posts, each of which supports a signal-box, and made connections from the same to the underground conduits of the New England Telephone and Telegraph Company. This Department has used rubber-covered cables of 2, 10, 18, and 37 conductors.

Work for the year comprised :

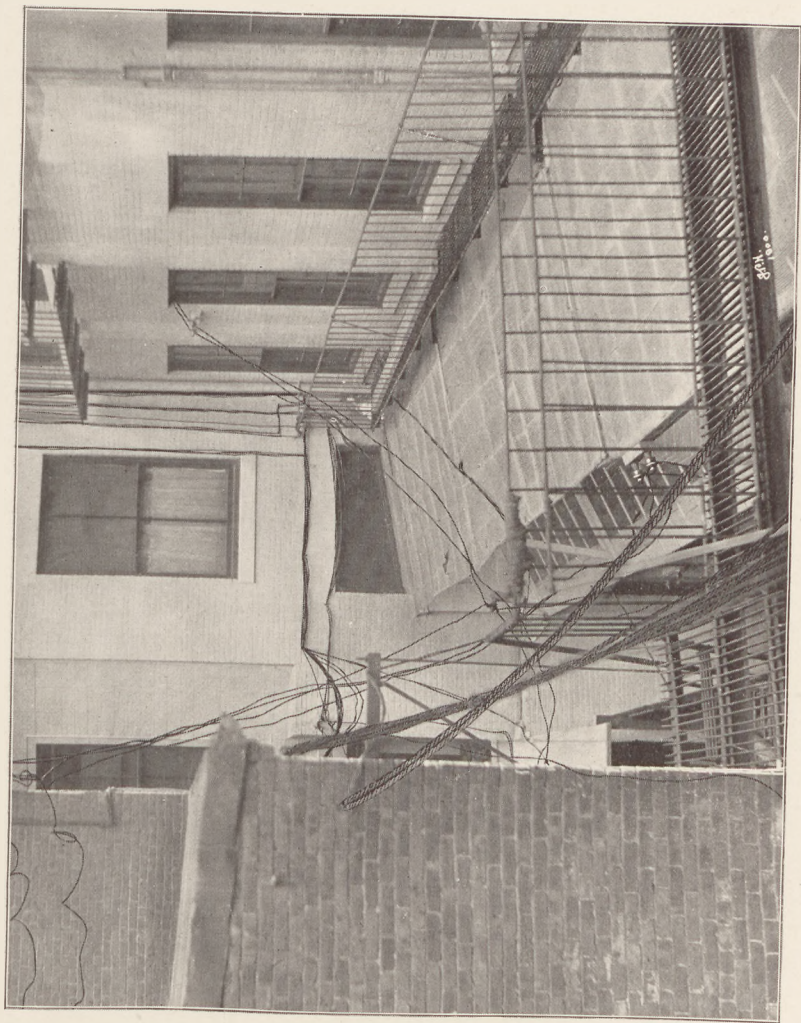
- 956 feet of conduit completed.
- 3,038 feet of duct laid.
- 12,398 feet of cable drawn.
- 27 services connected.
- 2 manholes built.

The American Telephone and Telegraph Company has during the year made one service connection of fifteen feet and drawn into their ducts 3,920 feet of paper-insulated cable of one hundred conductors.

Mixer Brothers has drawn into their ducts two hundred forty-two feet of paper-insulated cable, thirty conductors, during the year.

The New England Telegraph Company, Boston Auxiliary Fire Alarm Company, and United Telegram Company have done no work during the year.

R. H. White Company has made a connection this year across Harrison avenue, from their store to a storehouse opposite; forty-five feet of wrought-iron pipe was used for this construction, and a cable about sixty feet in length, made up of eight strands of paper-insulated wire, has been drawn into the same. This is to be used for telephone and signalling purposes.



REAR OF WASHINGTON AND BROMFIELD STREETS.

Plate No. 11.

Table Showing the Underground Work of Year 1900.

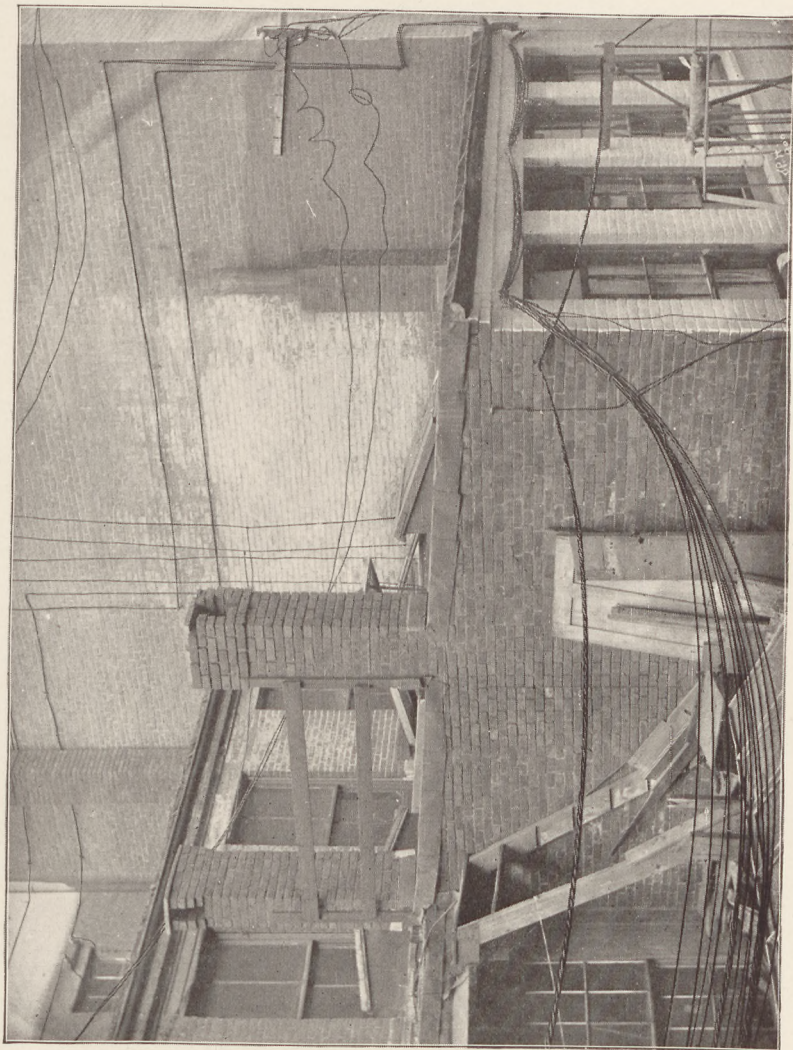
COMPANY.	Feet of Conduit.	Feet of Duct.	Feet of Cable.	Number of Manholes.	Services.
American Telephone & Telegraph Co. ....		15	3,920		1
Boston Electric Light Co. ....	30,674	107,355	339,005	166	302
Boston Elevated Railway Co. ....	3,710	31,860	58,887	18	10
Boston Automatic Fire-Alarm Co. ....	858	2,723	1,534	5	8
Boston Low-Tension Wire Association. ....	1,126	1,906		3	9
Boston District Messenger Co. ....			4,683		
Boston Terminal Co. ....			11,657		
Boston & Maine Railroad Co. ....			55		
Brookline Gas-Light Co. ....	860	4,995	9,709	5	9
Church Green Electric Light & Power Co.,		14	18		1
Edison Electric Illuminating Co. ....	8,724	125,831	40,327	32	283
Fire-Alarm Branch (B. F. D.) ..	956	3,038	12,398	2	27
Holmes Electric Protective Co. ....			2,087		
King, D. Webster .....			135		
Massachusetts Telephone & Telegraph Co.,	8,060	149,993	17,314	58	70
New England Telephone & Telegraph Co.,	76,397	370,936	196,036	260	265
Mutual District Messenger Co. ....			3,380		
Mixer Brothers. ....			242		
Mt. Hope Cemetery .....	1,345	1,339	3,272	2	2
Park Department (City of Boston). ....	1,470	1,452	42,549	6	
Police Signal Service (B. P. D.) ..	6,595	9,315	39,783	10	20
Postal Telegraph Cable Co. ....	658	2,000	1,000	3	18
Public Institutions (City of Boston). ....	1,687	1,824	600	7	2
Suburban Light & Power Co. ....		78			1
Western Union Telegraph Co. ....	1,523	1,729	4,837	5	6
White, R. H. Co. ....		45	60		1
New England Women's Hospital. ....	520	520			
Totals. ....	145,163	816,968	784,488	582	1,035

Main and feeder tube or solid-system distribution boxes are not included in these figures. Amount of tube laid in the year 1900, 34,136 feet, of which 22,603 feet is conduit tube, and there were twenty-four distribution boxes installed.

**Table Showing the Underground Electric Service of Boston.**

	To 1896.	1896.	1897.	1898.	1899.	1900.
Feet of conduit .....	646,258	144,280	153,631	116,638	123,566	167,766
Feet of single duct... ..	2,625,247	722,632	740,764	827,879	765,484	851,104
Feet of cable.....	2,452,457	1,088,012	853,794	1,202,914	1,613,871	784,488
Number of manholes .....	1,849	608	782	557	535	582
Number of services .....	4,180	1,080	1,103	943	895	1,035
Feet of tube (Edison).....	298,800	37,165	46,481	13,463	17,843	34,136

The Edison Company have 412 distribution boxes in the City, not included in the above, and the Park Department have something like 140 three-and-four-way boxes.



REAR OF WASHINGTON AND BROMFIELD STREETS.

Plate No. 12.



Table showing the Amount and Distribution of Boston's Electrical Power, January 31, 1898.

COMPANIES.	Total rated Horse Power of Boilers.	Total rated Horse Power of Engines.	Capacity in Incandescent Lamps.	Capacity in Arc Lamps.	Number of Motors.	Horse Power of Motors.	Number of Stations.
Boston Elevated Railway Co.....		34,450	24,840	94	3,413	36,530	7
Boston Electric Light Co.....	6,090	9,142	32,700	4,890	791	2,282	6
Edison Electric Illuminating Co.....	6,419	8,125	161,840	1,505	1,751	5,901	5
Suburban Light and Power Co.....	895	1,150	7,750	495	140	614	2
Charlestown Gas and Electric Light Co.....	625	525	6,000	510	7	25	1
Brookline Gas Light Co.....	875	2,645	8,200	680	21	180	1
Church Green Electric Light and Power Co.....	770	685	6,500		42	210	1
Isolated Plants.....			107,708	1,410	273	2,887	178
Block Plant Co.....	273	287	2,300		9	12	1
<b>Totals</b> .....	15,947	57,009	357,838	9,584	6,447	48,641	203

January 31, 1899.

Boston Elevated Railway Co.....	20,770	34,500	27,700	195	3,447	68,940	7
Boston Electric Light Co.....	14,890	19,142	66,000	8,000	1,189	3,419	7
Edison Electric Illuminating Co.....	50,709	8,085	176,430	1,750	1,901	7,026	5
Suburban Light and Power Co.....	895	1,150	9,650	495	140	614	2
Charlestown Gas and Electric Light Co.....	770	685	7,400	8	48	270	5
Brookline Gas Light Co.....	1,450	2,400	16,000	680	24	195	1
Church Green Electric Light and Power Co.....	625	525	6,000	510	11	43	1
Isolated Plants.....			112,963	1,456	301	3,465	195
Block Plant Co.....	273	287	2,300		9	30	1
<b>Totals</b> .....	90,382	66,774	424,443	13,094	7,070	84,002	224

January 31, 1900.

Boston Elevated Railway Co.....	20,770	34,500	35,780	198	3,697	73,940	7
Boston Electric Light Co.....	10,690	10,250	98,300	7,060	1,244	3,536	3
Edison Electric Illuminating Co.....	7,381	10,700	207,966	2,074	2,261	8,926	5
Suburban Light and Power Co.....	895	1,150	8,100	455	127	616	2
Charlestown Gas and Electric Light Co.....	625	790	7,400	510	48	270	1
Brookline Gas Light Co.....	1,450	2,400	16,000	680	32	245	1
Church Green Electric Light and Power Co.....	770	685	7,500	26	63	630	5
* Isolated Plants.....			116,560	1,793	298	2,697	203
Block Plant Co.....	273	287	2,300		9	30	1
<b>Totals</b> .....	42,854	60,762	499,906	12,796	7,779	90,890	228

\*The capacity of generators for Isolated Plants in K. W., 11,889.25.

January 31, 1901.

Boston Elevated Railway Co.....	20,770	38,500	39,810	237	3,965	79,300	7
Boston Electric Light Co.....	13,900	13,900	143,000	5,200	1,622	4,980	3
Edison Electric Illuminating Co.....	7,257	10,700	239,631	2,313	2,411	10,041	6
Suburban Light and Power Co.....	895	1,150	9,800	555	165	720	2
Charlestown Gas and Electric Light Co.....	625	790	7,400	510	48	270	1
Brookline Gas Light Co.....	1,450	2,400	16,000	680	36	287	1
Church Green Electric Light and Power Co.....	770	685	7,250	38	67	682	5
* Isolated Plants.....	57,960	35,015	193,091	3,297	714	6,257	271
Block Plant Co.....	273	417	4,900		9	25	1
<b>Totals</b> .....	103,900	103,557	660,882	12,830	9,037	102,562	297

\*The capacity of generators for Isolated Plants in K. W., 18,205.50.

In some of the Isolated Plants the boilers and engines are used for other purposes.

## INTERIOR DIVISION.

The duties of this division increased largely over previous years, as may be seen by comparison of the figurers of work for the past year with those for the previous years of the Department's existence. This increase is the result of the natural and healthy growth of the use of electricity for light, heat, and power purposes, at the present time there being few buildings erected in which provision is not made for its use.

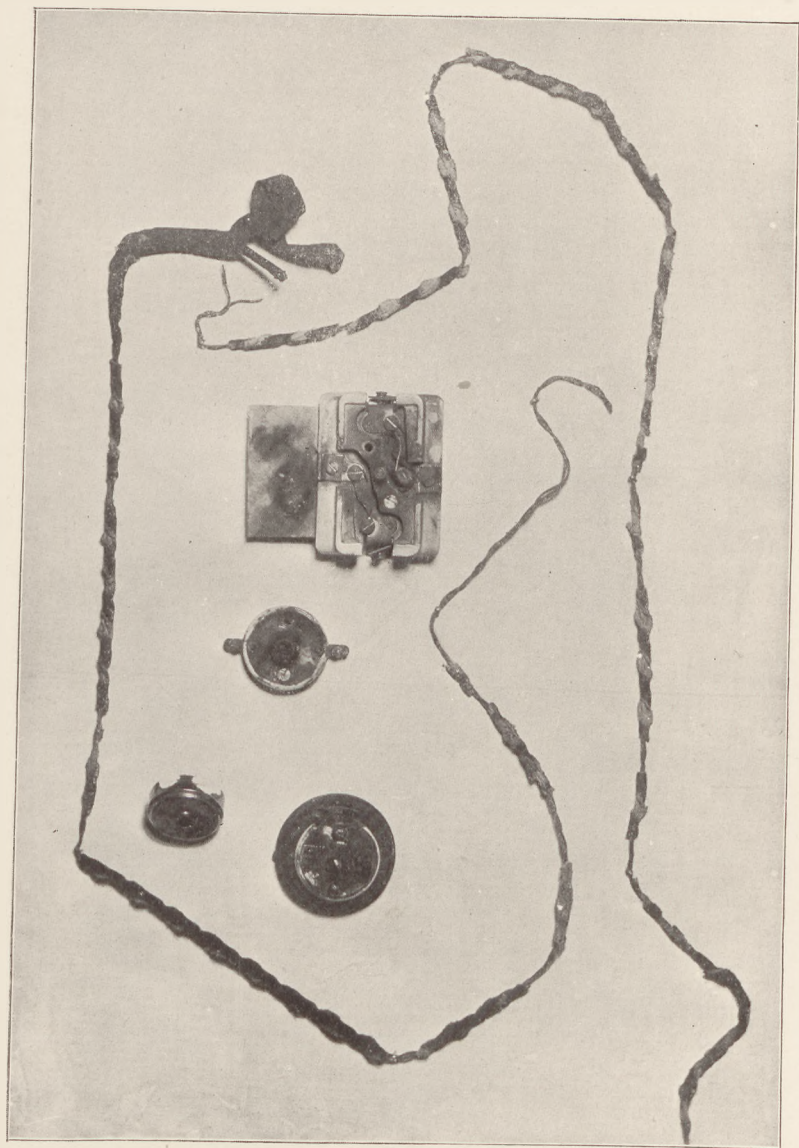
As wiring of new buildings is in almost all cases installed during their construction, upon the completion of which, wiring is concealed from view, it necessitates that a constant and careful supervision of all electrical work shall be made during its installation, that all reasonable precautions may be taken to prevent its becoming, when put into service, a menace to persons or property. Some supervision of electrical work is also necessary until building is completed, even though the work of the electrical contractor is done in a safe and satisfactory manner, as the average workman in lines other than those electrical seems to have no proper appreciation of the possible dangers that may arise from injury to wires or their insulation, or to the running in close proximity to same of pipes or other matter foreign to them, and while work of electrical contractor might be done in a safe and satisfactory manner, some action on the part of employees of other contractors might make wiring, etc., unsafe.

The old wiring installed previous to the organization of the Wire Department, and which is a constant menace to safety, has received more attention than in former years. This was made possible without neglecting new wiring, for the proper installation of which we feel directly responsible, by the addition of one inspector whose time has been entirely devoted to the inspection of old wiring and electric light and power installations, also the making of such electrical tests of same called for in the interests of safety.

As has been customary in the past, special attention has been given the wiring and electrical apparatus of our theatres, halls, and large stores, where many people congregate, and where a serious fire would mean not only the destruction of property but the probable loss of human life.

A source of danger constantly arising in our theatres, and which necessitates weekly and careful inspection in same, is the wiring and electrical apparatus forming a part of the "properties" of the various theatrical companies who fulfil engagements in this City. In many cases this wiring brought by the visiting company is in such a condition that its use is not permitted until extensive changes are made in the same, and in some cases it is so dangerous that it is condemned entirely.

All accidents and fires reported to be due to electrical causes have received the prompt attention of the Department both day and night, and fires for which two or more alarms were given,



SWITCH, ROSETTE, CUTOFF, AND PIECES OF CABLE, TAKEN FROM NO. 105 SUMMER STREET.

Plate No. 13.

have been attended by representatives of the Department who have rendered such assistance to the Fire Department as the circumstances required, and who also took note of such electrical matters as might be of interest to this Department.

During the year heavy currents of electricity have entered five buildings over service gas pipes, in two of the buildings melting pipes and starting fires, in two buildings causing slight fires, and in one building melting holes in some pipes but doing no other damage.

With the exception of loss from the serious burnout at the First Station of the Edison Electric Illuminating Company, referred to elsewhere in this report, the losses from fires due to electricity were small, as the fires were mainly insignificant in character, there being but one recorded where the insurance loss exceeded \$200, and the majority of the fires caused no insurance loss whatever.

During the year there was no fire which was caused by wiring approved by the Department.

Underground services for buildings have received special attention, an inspector examining all proposed locations for same, and if location selected by the representative of the company installing service was not satisfactory to inspector a new and approved location was decided upon.

There have been eight accidents to persons, four of which had fatal results. The victims of the fatal accidents were all men accustomed to working on high potential circuits, and they met their death while in the performance of their duties.

Of the other four accidents, three of which were not serious, occurred to persons unfamiliar with electrical matters, and the victim of the other accident was a lineman in the employ of the Postal Telegraph Company, who was injured while in the performance of his duty by a shock due to a leakage of current from a high potential wire. Whether he was or was not familiar with high potential circuits is unknown.

Important changes and improvements have been made at the First Station of the Edison Electric Illuminating Company, Head place, in the equipment of the cable vault, where a fire occurred October 11.

The improvements consist chiefly in substituting a system of bare copper conductors for the old cable feeders between the main switchboard and the pits which terminate the duct lines from the street system. The main switchboard is situated in No. 1 Battery Building on the first floor. The feeders were formerly lead downwards from the switchboard to the basement and there divided into two sections, the one running to a small pit situated near the west wall of the basement and the other running at right angles to this towards a pit in the vault under Bumstead court. These cables were each enclosed in an iron-armored conduit, supported on iron brackets. A fair idea of the arrangement will be seen in Plate 22, which is a photograph taken at the Company's Second Station of a similar system.

A practical reconstruction of the entire installation has now taken place.

The pit near the west wall has been greatly enlarged and brought nearer the centre of the room. The ducts are now so arranged that the positive and negative terminals are separated by a brick wall, and the ends of the individual ducts are stepped off and so placed that each terminal lug may be handled with the greatest ease and safety. The vault under Bumstead court has been completely divided in two by a brick wall, so that the cable vault is now entirely distinct from that part containing certain steam auxiliaries, and the old cable pit has practically been discarded. The sides and floor of this vault have also been thoroughly waterproofed.

The conductors between the switchboard and the two terminal pits now number about forty-five pairs. They are each made up of two pieces of  $2 \times \frac{1}{4}$ -inch hard-drawn copper separated  $\frac{1}{4}$  inch apart. These are supported and secured on large blocks of Alberene stone, boiled in oil, which are in turn mounted on a solid system of iron hangers and brackets.

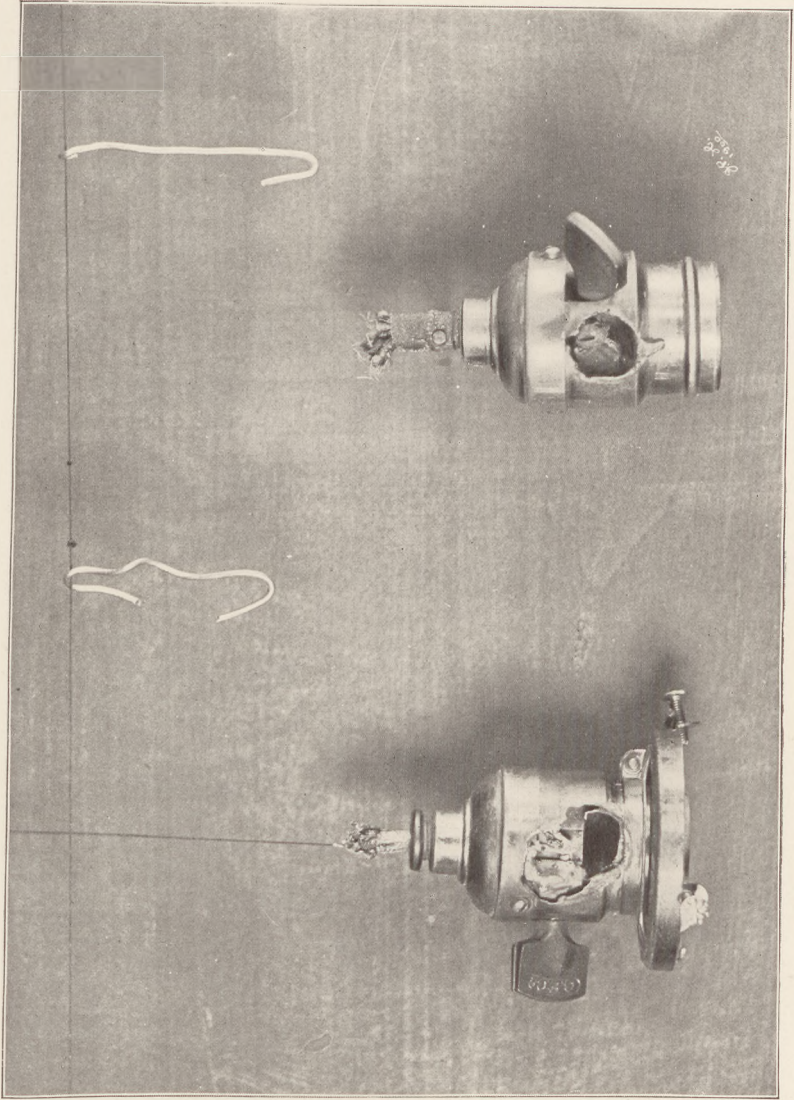
No conductors is less than 4 inches from an adjacent one of same polarity, and opposite polarities are separated by more than 18 inches, and all joints have a large contact surface. The bare copper arranged in this manner allows for a very free radiation of heat. The materials used insure the whole installation being absolutely fireproof. Great care has been taken to allow for the free expansion of the conductors, which might be caused by short periods of overload, due to possible trouble on the underground system, thus insuring an absence of buckling on any part of the system.

To guard against accidents of a general character, all parts of the system liable to be within reach of unauthorized persons have been securely enclosed with strong iron fences. Plate 23 shows the vault under Bumstead court and Plate 24 shows a general view of the conductor work in the basement room.

The following is a record of the isolated plants in operation in this City :

Number of plants,	271.		
“ “ boilers,	589,	total horse-power,	57,960
“ “ engines,	376,	“ “ “	35,015 $\frac{1}{2}$
“ “ generators,	466,	“ kilowatt ca-	
		capacity,	18,205 $\frac{1}{2}$
“ “ motors,	714,	total horse-power,	6,257 $\frac{2}{3}$
Number of incandescents,	193,091.		
“ “ arcs,	3,297.		

Systematic inspection with necessary tests are underway, which upon the completion of same will include all isolated plants in this City of which we have any knowledge.



SOCKETS AND COPPER WIRES (USED FOR FUSES).

Plate No. 14.

During the year completed, January 31, 1901, there have been one hundred and ninety-seven (197) isolated plants inspected, and tested for "grounds."

Of these plants one hundred and twenty (120) were found defective, many being in a condition absolutely dangerous, and not only a menace to the building or buildings in which they were contained, but also a menace to neighboring property.

Owners of isolated plants in each and every case where defects were found, were notified of same, and with very few exceptions our requests for correction of defects have been cheerfully complied with.

The equipment of isolated plants inspected is as follows:

Number of generators	341, total kilowatt ca-	
	capacity	12,904½
“ “ boilers,	430, total horse-power	40,965
“ “ engines,	281, “ “ “	29,214½
“ “ motors,	519, “ “ “	4,743
“ “ incandescents,	135,949.	
“ “ arcs,	2,557.	

The following is a complete summary of the work of the Interior Division for the year ending January 31, 1901:

5,859	Notices of new work received.
570	Buildings in which wiring was completely examined.
316,074	Incandescent lights examined.
5,697	Arc lights examined.
1,922	Motors examined.
11,150½	Total horse-power of motors examined.
1,176	Services examined.
12,609	Inspections made.
2,274	Defects reported.
1,622	Defects corrected.
	Other defects are in process of correction.

During the year there have been sixty-five fires or accidents to property, the origin of which was traced to electricity.

They are classified as follows:

- 29 fires in the interior of buildings.
  - 1 fire on roof of building.
  - 4 fires on outside walls of building.
  - 1 fire on stand-pipe for distribution.
- 3 fires at bridges.
- 7 fires on poles.
- 9 fires in trees.
- 1 fire and explosion at underground catch-box.
- 1 gas explosion in manhole.
- 6 transformer burn-outs.
- 3 miscellaneous.

Total, 65

Of the transformer burn-outs, four of them resulted in the primary current entering buildings over the secondary wiring of same, doing more or less injury to wiring and fixtures, and in three cases starting fires inside of buildings.

In two of the three other cases the Fire Department were called, but their services were not required.

#### FIRES.

*February 4.* At 8.20 P.M. No. 475 Harrison avenue. Water worked into a cut-out box on a high potential arc circuit of the Boston Electric Light Company, and current grounded through a screw supporting cut-out box to woodwork. No insurance loss.

*February 8.* At 7.25 P.M. Corner of Rutland street and Shawmut avenue. Two tree fires, caused by a current from a high potential circuit of the Boston Electric Light Company, the wire of this circuit being in contact with a span wire of the Boston Elevated Railway Company, which was also in contact with limbs of trees.

*February 8.* At 7.45 P.M. Washington and Canton streets. High potential arc wire of the Boston Electric Light Company became detached from insulator and came in contact with a fixture arm during a rain-storm. Current grounded at this point, and fixture arm was slightly burned.

*February 5.* No. 256 Swett street. Fire was discovered on arrival of an employee in the early morning. In stone-shed was a derrick and car operated by a 500-volt motor located on car, current for motor being supplied from the system of the Suburban Light and Power Company. At some time during the night this car was started by some unauthorized person, run into and part way through the ends of doors of shed, where it stopped. Current was left on motor, the coils of which became overheated and burned out and fire was communicated to wood timbers, etc., of car. No damage except to car and motor.

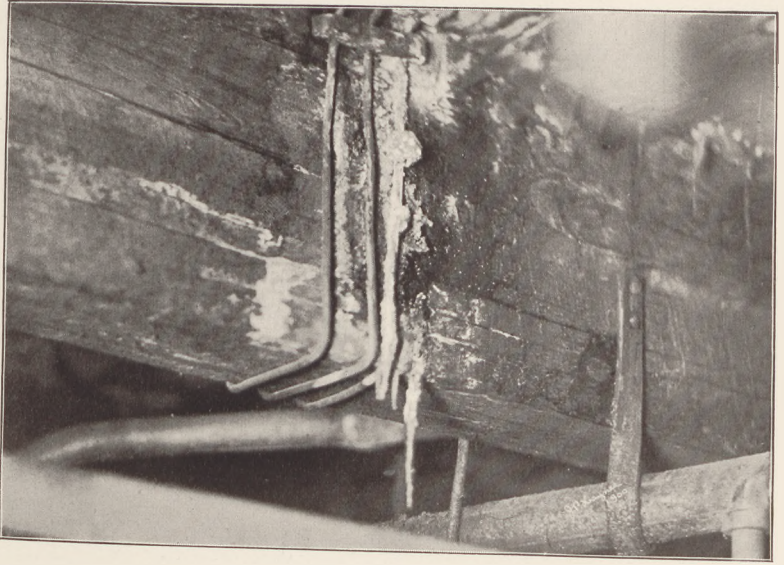
*February 9.* At 11 A.M. Box 116. Slight fire on underside of the Dover-street bridge, across the Boston & Albany Railroad tracks. Fire was caused by leakage of current from an electric feeder of the Boston Elevated Railway, leakage being due to a breakdown in the insulation of feeder, probably caused by the heat, smoke, and gases from locomotives passing beneath, and to the wet weather which had prevailed for several days before fire occurred.

*February 12.* At 10.30 P.M. Back Bay Station of the New York, New Haven & Hartford Railroad. A short circuit occurred in a lamp receptacle in loft of building, while watchman was attempting to remove a defective lamp. Fuse in cut-out blew, an arc was maintained across the terminals of cut-out, and insulation on wires entering cut-out was ignited and burned for several inches. Fire was extinguished by watchman without further damage. See plate No. 18.

*February 14.* No. 246 Washington street. Slight electrical trouble due to grounding of a motor circuit, caused by a piece of zinc resting on an iron pipe being jammed against wire and cutting into insulation of same. A hole melted in zinc; otherwise no damage was done.

*March 1.* At 9.41 A.M. Nos. 23-25, 22-32, and 48-50 Pearl street. Slight fires occurred at these buildings as a result of heavy currents of electricity entering over their gas-service pipes.





EFFECTS OF ELECTROLYTIC SALTS ON WIRES.

Plate No. 15.



DETAIL OF ABOVE.

Plate No. 16.

At Nos. 23-25 Pearl street. Amount of electricity passing over pipes was sufficient to melt off a  $\frac{3}{8}$ -inch gas-pipe and badly fuse  $1\frac{1}{4}$ -inch service-pipe with which the  $\frac{3}{8}$ -inch pipe was in contact, gas issuing from the smaller pipe being ignited and the flame therefrom charring and scorching the neighboring woodwork in basement. On the first floor two lead water-pipes had irregular holes melted in them at points where they were in contact with other pipes. At building Nos. 22-32 Pearl street the insulation was burned off of some ground wires which were a portion of the system of the Boston Automatic Fire Alarm Company, and which wires afforded a path for the current between the gas and water piping of the building. Moulding containing wires was also somewhat burned.

At building Nos. 48-50 Pearl street current entering same over gas-pipe was sufficient to melt off the  $1\frac{1}{4}$ -inch lead service-pipe to meter, and gas issuing therefrom was ignited. As there was nothing inflammable in the vicinity of this meter fire did not spread. Investigation showed that the source of current of electricity entering these buildings was an underground electric feeder of the Edison system, two burn-outs having occurred in same simultaneously with the electrical troubles at the buildings mentioned above. One of these burn-outs occurred opposite No. 43 and the other opposite No. 81 Pearl street.

It is evident that when burn-outs occurred the electrical conductor or conductors were brought into electrical connection with the pipe in which they were contained, over which pipe the current passed to gas-pipe with which conduit tube must at some point have been in contact. See plate No. 21. Insurance loss was adjusted at \$351.10.

*March 3.* At 11.43 A.M. A building at the head of Lewis wharf and on Atlantic avenue was being demolished, wood from same being given to whoever would remove it. An electric service cable of the Edison Electric Illuminating Company, which entered this building attracted the attention of an Italian who attempted to cut a piece off the cable with his axe. Cable was alive and short-circuit which resulted from blow with axe ignited the insulation of the cable and fire was communicated to waste lumber. Fire Department called on still alarm.

*March 15.* At 10.37 A.M. No. 105 Summer street, Church Green Building. As a result of short-circuit elevator cable feeding light in elevator car became overcharged, insulation took fire and burning particles of same dropped to bottom of elevator well igniting loose paper and other rubbish in same. Cut-out did not relieve the short-circuit as in place of proper fuses cut-out had pieces of copper wire in same. No insurance loss. See plate No. 13.

*March 20.* Dorchester avenue, opposite Second street. Slight fire caused by a live high potential wire of the Boston Electric Light Company falling upon a sign, as a result of which the sign was burned for about two feet in length. Reported by Fire Department. No insurance loss.

*April 10.* At 6.48 P.M. No. 72 Boylston street, Hotel Pelham. Slight fire in elevator machinery well. Fire was confined to the insulation of an incandescent lighting circuit and a bunch of bell and other wires in wellway and to the burning and charring of woodwork in that part of wellway where wires were located. Probable cause, poor connection at switch on incandescent light circuit as a result of which a slight arc ignited insulation of wire. Alarm from Box 55. Insurance loss about \$400.

*April 14.* At 8 P.M. No. 392-394 Boylston street. Owing to trouble at the Power Station supply of current was not sufficient to meet the demand on the system. Elevator motor at this place stopped on account of lack of current and attendant neglected to shut current off. Later smoke was seen issuing from motor-room and was found to come from the coils of rheostat, which had become overheated. Switch was opened and trouble ceased. Engine Company 33 and Hook and Ladder Company 16 were called as a precautionary measure, but their services were not required.

*April 22.* At 8.20 P.M. No. 2 Maverick square, East Boston. Slight fire caused by a short-circuit in wires beneath canopy of combination fixture. Insulation on a foot or so of wire and about the same amount of moulding above fixture burned; also, insulating joint on fixture was considerably burned. Alarm from Box 628. Insurance loss, \$200.

*April 30.* About 2.30 P.M. No. 11 Elm street. Electrical disturbance. A heavy current of electricity entered this building over gas-pipe, source of same being underground tie feeder of the Edison Electric Illuminating Company, a burn-out having occurred in same at a point about 15 feet from this place. Lead beer pipes were melted in several places, and where metal ceiling and soil pipe were in contact with each other both were melted.

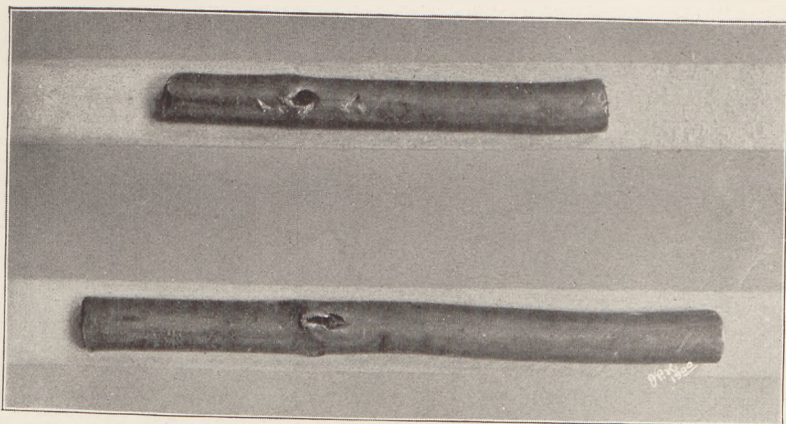
*May 8.* At 8.20 P.M. Opposite No. 229 Blue Hill avenue. Power wire of the Boston Electric Light Company came in contact with a spike on limb of tree, current from same setting fire to limb and damaging Postal Telegraph Cable Company cables. Alarm from Box 242.

*May 8.* Early evening. Clarendon street, Grundmann Studio Building. Slight fire in Room 10, which was extinguished by occupant. Owing to leaky roof the moulding containing wires on side wall became saturated with water, insulation of wire deteriorated, an arc was established between the two wires of opposite polarity and insulation of wire, also the moulding, was ignited. Damage was very slight. No insurance loss.

*May 9.* No. 111 Kneeland street. A strong smell of gas being noticed an investigation was made and a hole was found in a  $\frac{3}{8}$ -inch gas-pipe in basement at a point where same was crossed with a 110-volt electric lighting system furnished with current by the Edison Electric Illuminating Company. Basement was very wet, wiring badly grounded, and hole in pipe corroded by electrolytic action due to existing conditions.

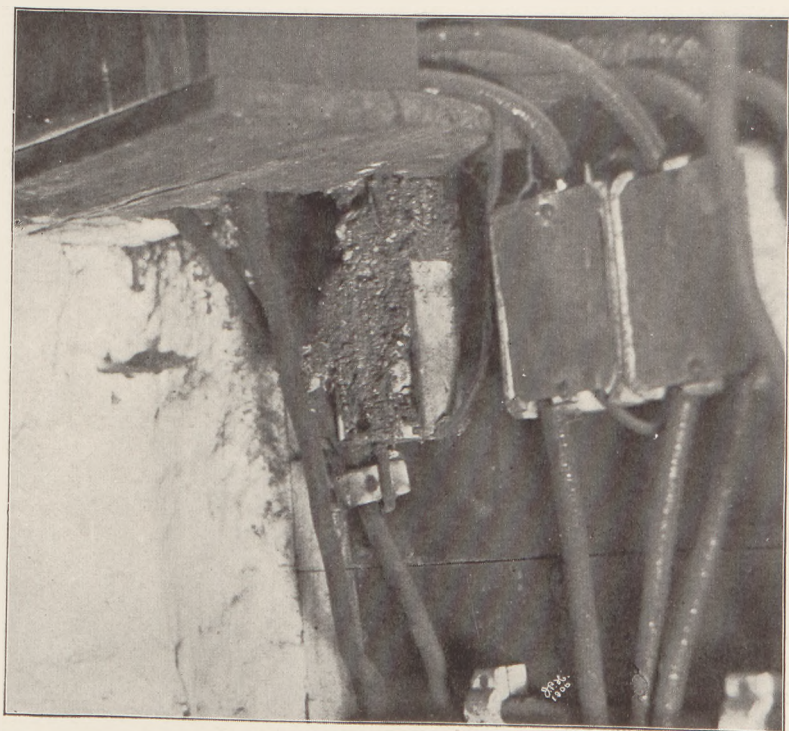
*May 15.* At 8.30 P.M. Dorchester street, between Fifth and Bowen streets. Arcing of Boston Electric Light Company wires on trees.

*May 15.* About 11 P.M. Andrews square. A street arc-lamp pole was found on fire. Pole, although fed from overhead, was of a type designed to feed from underground service, it being hollow so that cable could be pulled up inside of same from underground duct. The top of pole is an iron pipe or "gooseneck" from which a lamp is hung. This "gooseneck" is fastened to top of wood pole by iron lag screws, one of which passed through wood so that point of lag screw entered hollow space in pole. In contact with this point was an iron wire which ran to the ground. This had been left in pole for future use in drawing in cables. The night was stormy and current from circuit escaped to iron portion of pole, thence over lag bolt and iron wire to ground. Arc formed at point of contact between lag bolt and iron wire ignited wood of pole.



TWO PIECES OF LEAD SHEATH CABLE TAKEN FROM A 500-VOLT  
AND A 2,000-VOLT CIRCUIT.

Plate No. 17.



CONDITION OF CUTOUT AS FOUND BY THIS DEPARTMENT.

Plate No. 18.

*May 20.* Evening. Opposite No. 139 Cedar street. Tree fire, caused by wires of the Boston Electric Light Company lying on limb of tree and arm of pole. Engine Company 14 called on a still alarm.

*June 4.* At 8.15 P.M. Castle Island bridge. Fire started at the butt of a wood supporting pole for a series arc-lamp at point where wire entered pole to run up to lamp and was due to circuit grounding at this point. Bridge in vicinity of pole was quite severely burned. Fire Department called on a still alarm.

*June 9.* About 3 P.M. Parker House, School street. A flexible cord had been run by engineer from wires back of canopy of a wall bracket around side wall of room to a receptacle, for the purpose of furnishing additional light to occupant of room. On wall and attached to same by pins and tacks were many inflammable articles such as calendars, paper fans, etc. One of these fastenings was driven through cord in such a manner that subsequent jar or movement of cord completed short-circuit. Resulting fire caused a damage of about \$50.

*June 16.* At 10.20 A.M. No. 11 Otis street. Fire was the burning of a foot or two of the insulation of two No. 14 wires and a few inches of the moulding in which they were contained. Moulding was exposed to dampness and an electrolytic action took place between opposite poles of the circuit at point where current leakage occurred. An arc finally resulted igniting moulding and insulation of wires. Alarm from Box 52. No insurance loss.

*June 23.* At 12.10 A.M. No. 1050 Columbus avenue. Grounding of an arc light circuit on iron brace to an arc-lamp bracket over sidewalk. Window-frame burned and charred for several inches, otherwise no damage except to circuit. Severe rain storm in progress at the time. Engine Company 13 called on a still alarm.

*June 23, 24, and 25.* Evening. Opposite No. 46 East Newton street. Fires due to the arcing of Boston Electric Light Company's wires on limb of tree.

*June 29.* At 9 P.M. Opposite Ladder House 4, Dudley street. Tree fire, due to the arcing of Boston Electric Light Company's wires on limb of tree. Reported by the Fire Department.

*July 12.* At about 9.30 P.M. Corner of Dorchester avenue and Washington street, Dorchester. Fire in New England Telephone and Telegraph Company's cable box on pole at above location. Box destroyed, pole injured, and 34 telephones and one fire-alarm box cut out of service. Probable cause, lightning discharge or cross between one of the wires entering this box and a high potential wire.

*July 12.* At 9.38 P.M. No. 11 Ashburton place. Fire occurred in an enclosure or closet in space between building No. 9 Ashburton place and the Boston University School of Law Building, in which closet a service pipe containing 500 volt and primary cables of the Boston Electric Light Company terminated. In closet were also a large transformer and Fort Wayne cut-outs on the primaries, the latter being enclosed in a wooden box. Fire consisted of the burning of this box and several feet of the insulation of the wires, and was caused by the grounding of current of primary circuit at one of the cut-out boxes due to presence of water, a severe rain storm being in progress at the time, and roof of closet leaking badly. Engine Company 4 and Chemical Company 1 called on a still alarm. No insurance loss.

*July 28.* Columbus avenue and Heath street. Slight fire on pole

of the New England Telephone and Telegraph Company, caused by high potential wire of the Boston Electric Light Company coming in contact and grounding on cross-arm of pole.

*July 29.* At 12.58 A.M. Corner of Boylston and Washington streets. Slight fire, same being the burning of the insulation of wire on an induction coil used in connection with an arc lamp, and the scorching of ceiling immediately above coil. Cause, a crooked carbon in lamp prevented it from feeding properly, a short arc resulted, and an excessive flow of current passed through induction coil. Circuit cut-out was overfused and failed to operate in time to prevent trouble which occurred. Engine Company 26 called on a still alarm. No insurance loss.

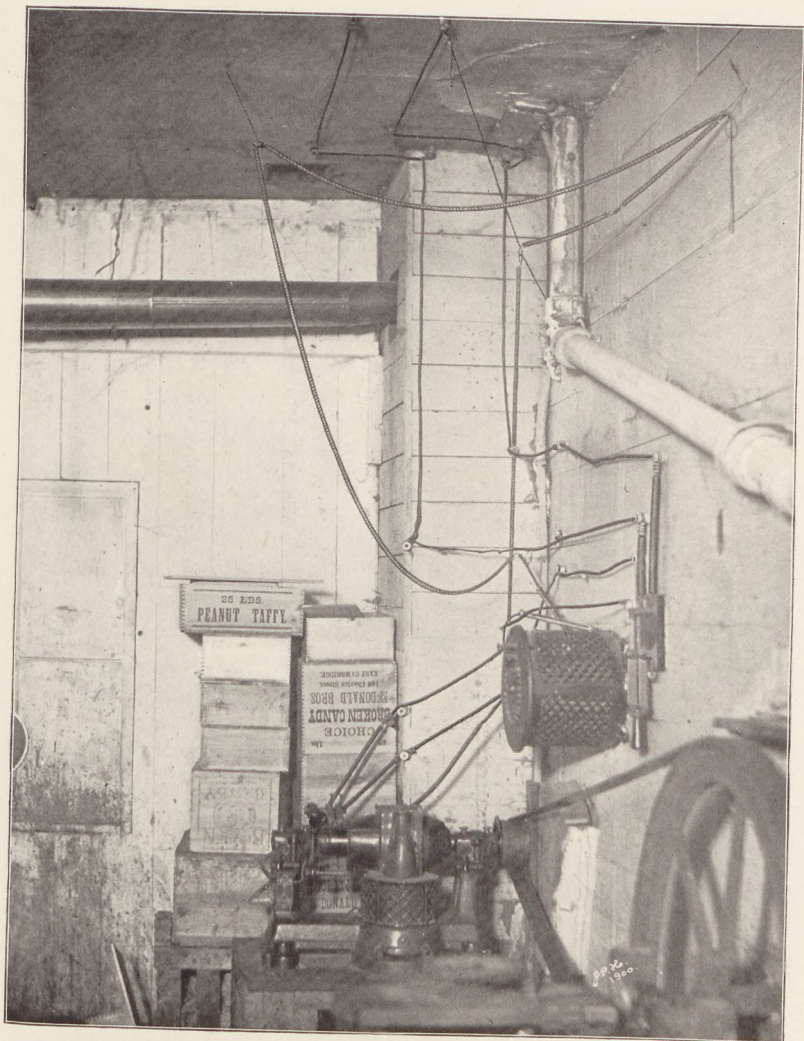
*July 31.* At 7.35 P.M. No. 487 Washington street. Slight fire, consisting of the burning of mosquito netting, with which a combined ceiling fan and incandescent lamp fixture was enwrapped. Fixture and ceiling slightly scorched. Cause, arc at one of the binding posts, due to a poor connection at same, ignited mosquito netting. Engine Company 26 called on a still alarm. No insurance loss.

*August 8.* At 7.45 P.M. No. 129 Staniford street. Fire was the burning of a sliding curtain at window of office booth and the scorching of frame, the curtain being ignited by the flash of a short circuit in an incandescent lamp pendant cord which hung in close proximity to curtain. Short circuit in cord was due to mechanical injury to insulation of same. Insurance loss, \$25. Current supplied by the Edison Electric Illuminating Company.

*August 28.* At 12.15 P.M. Third Station of the Edison Electric Illuminating Company, Atlantic avenue. At the rear of the boiler-room are located coal sheds of this company, between which and rear wall of boiler-room is an intervening space of about five feet in width, which is planked over.

Beneath this planking, in a space perhaps 5 feet in height, is located a wooden box, used as a junction box, in which junctions are made between cables from power-house and sub-marine cables which run under Fort Point channel. This box also is filled with compound and at high tide is covered with several inches of tide water. Work was going on this morning at this junction box in connection with pressure wires contained in same, and while workman was cutting away the compound to free the pressure wires he inadvertently drove a cold chisel into the negative pole of feeder, grounding same to iron pipe, thereby causing a short-circuit, which apparently burned itself clear. This happened about 11 A.M. As the tide was rising to a point where box would soon be submerged, the workman melted compound down around conductors and then left them in what he supposed was a safe condition, until such time as tide would be low enough to permit a resumption of work. On the rise of the tide water to the cables a short-circuit in damaged cables again occurred, ignited insulating compound and neighboring stringers, planking, etc., fire working for a distance of several feet beneath plank flooring of coal shed. With the exception of damage to feeder there was no fire loss, as while planking, etc., was quite badly burned in places, it was not damaged sufficiently to necessitate the replacing of same with sound lumber. Alarm box 51.

*September 4.* No. 106 Friend street. A workman, assisting at re-setting a curbstone, drove a pick through tube of the Edison Electric Illuminating Company, causing a short circuit, resulting arc igniting board intended to protect tube. Fire extinguished with



"HOME-MADE" SPEED REGULATOR.

Plate No. 19.

sand by members of Hook and Ladder Company 1, who were called on a still alarm.

*September 6.* At 5.30 P.M. Opposite No. 375 Tremont street. Reported electric fire was a short circuit in an underground main of the Edison Electric Illuminating Company, short circuit being caused by workman of gas company, while attempting to locate a leak, driving his crowbar through planking covering tube and into tube. No damage except to mains and crowbar.

*September 14.* At 7 P.M. No. 280 Dorchester street. High potential wire of the Boston Electric Light Company, during the severe storm of September 12, was blown against and caught at base of tower of house, insulation of wire chafed off, and an arc formed between wire and zinc and copper work of tower. Damage about \$100. Fire Department called on a still alarm.

*September 14.* At 8.30 A.M. No. 9 Exchange place. Fixture cord grounded at outlet on pipe back of insulating joint. A hole was melted in gas-pipe, gas ignited, and a hole about 3 feet in diameter was burned in ceiling and floor above. Fire Department called on a still alarm. Current furnished by the Edison Electric Illuminating Company.

*September 15.* At 3 A.M. Chestnut Hill avenue, house of A. G. Everett. Breakdown in Stanley transformer permitted 2,000-volt current to enter building over secondary wiring of same. Burn-outs occurred at the various combination fixtures, and a fire was started at cut-out cabinet, badly burning the inside of same. Cabinet had a tight-fitting door and fire was extinguished, there being lack of air to support combustion. Loss about \$100.

*September 17.* At 7.35 P.M. September 18, about 11 A.M. Junction of Summer and Bedford streets, Church Green Building. At 7.35 P.M., September 17, Engine Company 7 and Hook and Ladder Company 17 were called to this building on account of windows of the Regal Shoe Company in basement being filled with smoke. Basement was ventilated, but firemen found no fire. The following forenoon flashing was noticed at a copper water conductor in freight elevator well, and Wire Department was notified. An investigation showed that this water conductor, also a similar conductor on the other side of building and passing through basement of the Regal Shoe Company, both being used to drain roof gutters, had holes melted in them, evidently by electric arcs. In elevator well was a No. 0000 set of mains belonging to and used by the Church Green Electric Light and Power Company for distribution purposes. One pole of these mains was grounded on iron pipe in which it was contained for a portion of its run, pipe in turn being in contact with water conductor over which current passed to various parts of the building. There was no fire, but arcing of current at several points and the appearance of smoke caused considerable alarm. System of the Church Green Company is grounded on one pole. Ground in pipe occurred where approved wire had been dishonestly spliced out with a short length of weatherproof wire.

*September 18.* At 6 P.M. Corner of River street and Central avenue. Tree fire. High potential wire of the Boston Electric Light Company became detached from insulator and came in contact with cross-arm attached to tree; current grounded and set fire to cross-arm. Wires of the Massachusetts Electric Railway Company were in contact with same tree at another point, current grounded and badly burned tree.



*September 20.* At 7.35 A.M. No. 109 Purchase street. A slight fire occurred in fourth floor, due to a defective automatic-starting rheostat of a 15 H. P. elevator motor, which caused excessive sparking at the brushes and commutator, igniting insulation of wires and a sheathed partition which was in close proximity to motor.

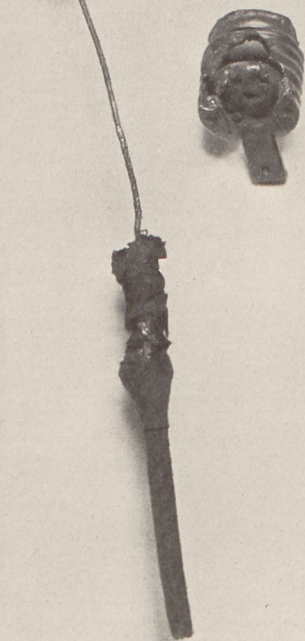
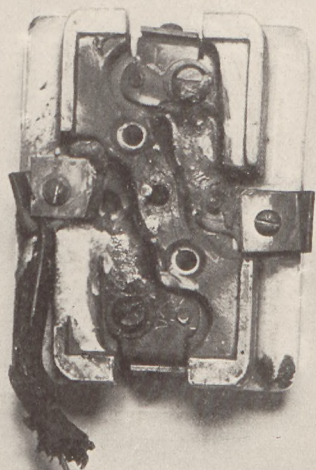
*September 28.* At 6 P.M. Castle Island Bridge. Grounding of high potential circuit of the Boston Electric Light Company at a series incandescent lamp in covered part of bridge, due to exposure to the weather.

*September 28.* At 8.40 A.M. No. 103-105 Chambers street. Short-circuit in Edison Electric Illuminating Company's underground service cable, due to injuries to cable by workmen constructing this building. No damage except to cable. Engine Company 6 called on a still alarm.

*October 8.* About 7.15 P.M. No. 108-112 Dudley street. Electrical trouble due to the grounding of current from a 500-volt circuit where wires were run (porcelain insulator work) on ceiling of basement at a location beneath a refrigerator on first floor and was the result of dampness affecting the insulation of circuit. Owing to the early discovery of trouble by the occupants of basement the damage was confined to the burning of the insulation of wire for an inch or two and the scorching of floor timbers in close proximity to same.

*October 11.* At 9.21 A.M. Box 273. No. 45 Peter Parley road. Fires were started at two wall outlets; a hole was melted in ceiling canopy to a combination fixture and service fuses were blown. The extent of fires was slight, being confined to the insulation on the wires at or near the outlets where fires occurred and the slight burning or charring of laths and studding at these points. Cause, breakdown in insulation of transformer supplying current for this wiring permitted current from primary circuit to enter house over secondary wiring of same. At points where fires occurred current grounded on gas-pipes, the resulting arc igniting insulation of wires.

*October 11.* At 7.29 A.M. Box 53. Head Place, First Station of the Edison Electric Illuminating Company. Directly under operating-room on the Bumstead court side of station is a cable vault or room into which 34 lead sheath cables, each cable of a capacity of 1,000,000 c.m., also a multiple conductor pressure wire cable of 60 pair of wires, enter underground from Bumstead court. These 1,000,000 c.m. cables, which were the positive and negative poles of various feeders from this station and of tie lines between this station and the Third Station, passed up the Bumstead court wall of cable-room to a convenient height, each cable in a lined pipe of so-called interior conduit manufactured by the Interior Conduit & Insulation Company, of New York, pipes being held in position by a framework made for that purpose, then cables bend and pass through similar pipes to points where they pass up through floor to switches in operating-room. Burn-out started in one of the cables at bend where it left the perpendicular and entered horizontal pipe, and extended to the other cables. As a result of burn-out numerous troubles occurred in the underground street system of the Edison Electric Illuminating Company, owing to the consequent overloading of feeders. The exact cause of burn-out in station it was impossible to determine. It may be that trouble was local in its origin and burn-out was due to a breakdown in the insulation of cable where fire was first discovered, or it may have been the result of a burn-out in the street.



CUTOUT AND LAMP BUTT FROM N. Y., N. H., & H. R.R. (BACK BAY STATION).

Plate No. 20.

*October 14* About 1 A.M. Hotel Bretagne, No. 496 Massachusetts avenue. Transformer burned out and primary and secondary coils were in electrical connection with each other. No damage done in building, with the exception that one circuit in same was found grounded. Cause of burn-out was the breaking off of a limb of a tree on Centre street, Jamaica Plain, which fell upon wires of the Boston Electric Light Company, Suburban Light and Power Company, and the New England Telephone and Telegraph Company, crossing them with each other and with the wires of the Boston Elevated Railway Company, upon which they fell. Circuits were grounded and insulation of transformer, unable to stand the strain, broke down. Current supplied by the Boston Electric Light Company.

*October 16.* At 7.14 P.M. Box 126. Corner E and Third streets, South Boston, St. Vincent's Church. Transformer located on the outside of building burned out, primary and secondary coils were brought thereby into electrical connection with each other, and primary current entered church over secondary wiring of same. Damage done by primary current entering building was slight, being confined to the breaking of filaments of several lamps and the blowing of several fuses. One circuit was also found grounded. Cause, an old piece of insulated wire, the ends of which were bare and hooked, had been thrown by some one standing in the street and one end of same hooked on to one wire of the primary alternating circuit while the other end hooked on to the arc circuit. The night was wet and stormy and consequently the so-called insulation of line wire was worthless and the two circuits were tied together by this old piece of wire. Circuits were grounded and wiring of church was either grounded or else it, as well as transformer supplying same, was unable to stand the strain caused by the crossing of the 2,000-volt primary circuit with the arc circuit, which had a potential of over 5,000 volts, and insulation of transformer broke down, with results as above stated. Current supplied by the Boston Electric Light Company.

*October 16.* Early evening. Franklin avenue. Transformer in manhole burned out, due to same cross between primary and arc circuits as burn-out in transformer in St. Vincent's Church. No damage except to transformer. Current supplied by the Boston Electric Light Company.

*October 16.* At 9 P.M. Hamilton place, Music Hall and Musée. Slight fire in fireproof booth in gallery where a vioscope, or moving picture machine, was located and operated. Film of machine broke and operator stopped machine, but failed to close shutter over lens. Heat from arc focussed on stationary film, ignited same, about 200 feet of film was destroyed, and operator in attempting to save film was severely burned about the face and hands. Owing to the excellent manner in which machine was installed no other damage was done. Current supplied by isolated plant on the premises.

*October 22.* At 5.30 P.M. No. 80 Blackstone street. Slight fire in doorway discovered by a woman employed in building and extinguished by persons summoned by her. Cause, passing up from stairway are mains from a 500-volt service of the Boston Electric Light Company entering basement of this building, current being supplied for several 500-volt motors located on different floors above. Where mains passed through floor of stairway entrance, porcelain floor tubes did not project sufficiently above floor to

prevent insulation of wires being injured, due to rain-water leaking into doorway and current from one of the wires grounded, an arc was established, wire burned off, and floor and wooden casing in which wires were enclosed had holes burned in same. Current supplied by the Boston Electric Light Company.

*November 4.* At 5.55 P.M., Box 162. No. 249-251 A street. This fire was caused by the carelessness of a workman who was using flexible cord for testing purposes. The two ends of wire were bared, so that contacts could be made, and the workman, after testing a machine with a 500-volt current, failed to throw switch and shortly after left the building. The ends of wire came in contact and an arc was established which ignited the insulation of the wire and fire was communicated to the workbench. Owing to its early discovery the loss by fire was slight. No insurance loss.

*November 2.* At 1 P.M. No. 568 Washington street. Slight fire on the outside wall of this building caused by a ground in the cables of the Boston Electric Light Company at top of stand-pipe. No damage was done except to cables. Engine Company 26 called on a still alarm.

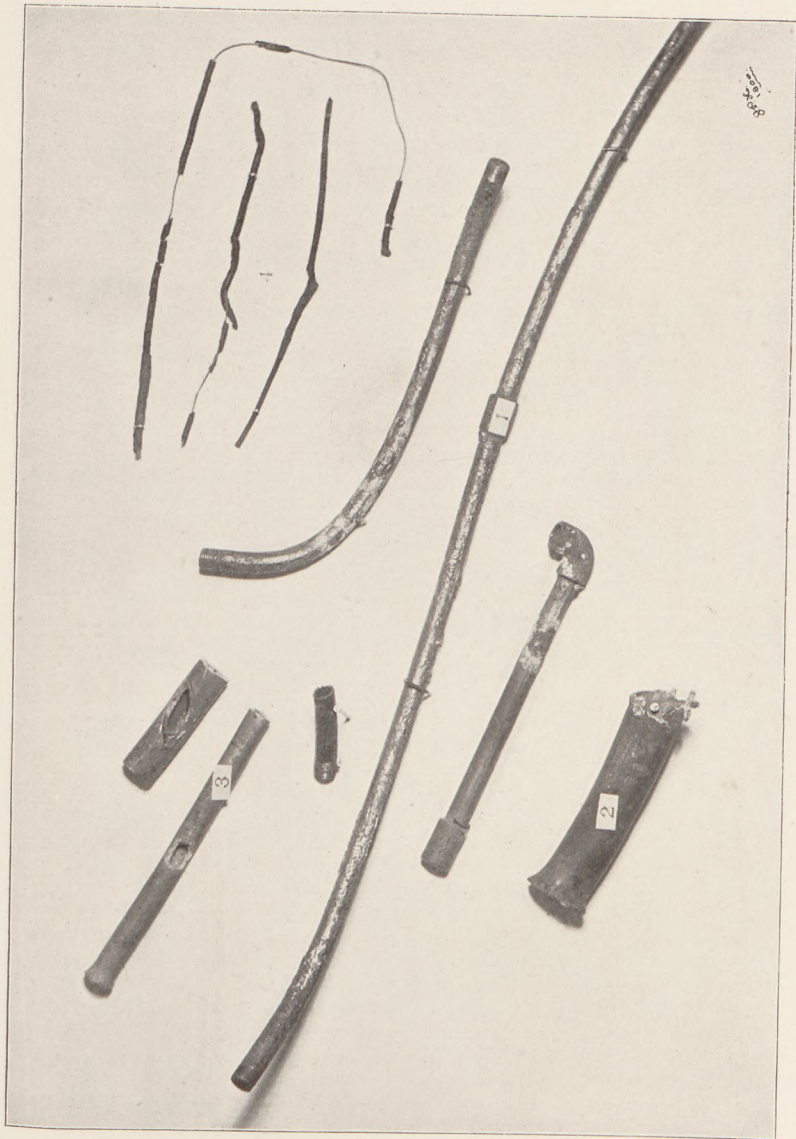
*November 21.* At 6.25 P.M. Centre and New Heath streets. Slight fire on pole of the Boston Electric Light Company, caused by wire becoming detached from insulator and coming in contact with iron brace; during the rain-storm a ground was formed through a guy which was also in contact with brace and fastened to tree in adjoining yard, setting fire to tree and pole and cross-arms, doing some damage to each.

*November 22.* At 5.35 P.M. At No. 303 Blue Hill avenue. Tree fire, due to the wires of the Boston Electric Light Company chafing against limb of tree and insulation wearing off. Current grounded and set fire to limb of tree. Damage slight. Box 274.

*December 6.* About 8.30 A.M. Savoy street. Burn-out in underground cables of the Boston Elevated Railway Company in Savoy street. Cause of the burn-out was the deterioration of insulation of cable and consequent grounding of current from same over lead sheath of cable and cement lined pipe duct, contact between lead sheath of cable and metal of duct being at iron connecting rings between lengths of cement lined ducts. One cable was so firmly welded to iron rings of conduit pipe that it was necessary to dig up street to remove both cable and pipe.

*December 7.* At 11.18 P.M. Corner Exeter and Boylston streets. Hotel Lenox. Slight fire in basement. Fire was a burn-out in a 400 light oil transformer caused by overload on same. Damage was confined to this and an adjacent transformer and to wires and other electrical apparatus. Fire Department called by a still alarm.

*December 14.* About 4.40 P.M. An alarm of fire was given from Box 16, for a fire and explosion in a tenway junction box in the Edison underground system of distribution, located on Merchants row between Faneuil Hall and Quincy Market. The first indication of the trouble was from the manhole covers being blown off by the force of the explosion of gas generated by the burning compound and ignited by the arc; the force of the explosion was sufficient to throw the covers up some ten or fifteen feet in the air, the inner one being broken in several places. The flames from the burning compound quickly followed the explosion and could not be extinguished until the feeders and mains centering in this box



PIPES AND WIRES TAKEN FROM BURNOUT ON PEARL STREET.

could be disconnected in the feeder boxes nearest to this one, which was done as quickly as possible.

Burn-out was probably due to an overload on feeders, mains, etc., resulting in the overheating of the conductors in one or more of the stubs leading into the box, softening up the compound and letting the conductors come in contact with each other or with iron tube containing them, thereby causing a short circuit.

*December 17.* About 4.40 P.M. Corner Cambridge street and Harvard avenue. Reported pole fire, found to be the burning of insulation of about two feet of twin cable feeding an arc-lamp of the Brookline Gas Light Company. Lamp was suspended from a carrier, supported by an iron pipe, projecting from wooden pole, and it was fed by a twin cable, the whole being so arranged that lamp could be pulled in to the pole every day for the purpose of trimming, etc. It is probable that as a result of wear and tear, cable finally broke, an arc was established, and insulation of wire was ignited.

*December 18.* At 9.20 P.M. Timothy Smith & Co., No. 2249 Washington street. Burn-out of defective "Davis" cut-out, belonging to the Boston Electric Light Company and located on side of building. No damage except to cut-out. Alarm from Box 218.

*December 30.* Dorchester avenue and Fifth street. Police cable crossing Dorchester avenue sagged and made a swinging contact with a Boston Electric Light Company wire, wearing off the insulation and current from the Boston Electric Light Company wire; burned out police cable.

*January 4, 1901.* About 9 A.M. No. 22-32 Pearl street. Slight fire on first floor, due to current of electricity entering building over gas-pipe, passing to water-pipe over ground wires which were attached to these pipes and which belong to the Boston Automatic Fire Alarm Company, overcharging wires, setting insulation of same on fire and igniting moulding in which wires were run. Also holes burned in service gas-pipes, one of which entered this building and the other entered building No. 99 Pearl street. Cause of same was burn-out in the underground electric feeders of the Edison Electric Illuminating Company, current from same passing over gas pipe with which the Edison underground tube was in contact.

*January 7.* Atlantic avenue, opposite Central street. Explosion of gas illuminating in manhole, cover of which was blown several feet in the air. No injury to persons or property.

*January 11.* Corner of Massachusetts avenue and Albany street. Contact between New England Telephone and Telegraph Company wires and the Boston Electric Light Company wires, causing arcing at points of contact. Cross due to the breaking of New England Telephone and Telegraph Company wires and their falling on wires of the Boston Electric Light Company.

*January 28.* At 11.24 A.M. Nos. 72-74 Leverett street. Engine Company No. 6 called on still alarm for slight fire, caused by wires of a two-light combination ceiling fixture grounding on gas pipe in back of fixture insulating joint. Damage confined to fixture and ceiling in the immediate vicinity of same.

#### ACCIDENTS TO PERSONS DUE TO ELECTRICITY.

*February 17, 1900.* Nicholas Olson, employed by the Postal Telegraph Company, while engaged working on their cables on the New England Telephone and Telegraph Company's poles on Blue Hill

avenue, was seriously injured by falling from the pole at the corner of Warren street and said avenue. It appears that Lineman Olson was climbing pole and had reached the lower cross-arm, one of the iron braces of which he grasped with one hand, while with the other hand he grasped an iron guy wire running from the pole he was on to an iron pole of the Boston Elevated Railway Company, about eight feet distant. From the bottom of this lower cross-arm was a short drop wire supporting two glass insulators to which were attached two primary alternating wires of the Suburban Light and Power Company, one of which was in contact with the iron brace, thereby charging same. When Olson grasped this brace and guy wire at the same time he thus completed a circuit through himself to the ground. Shocks received by Mr. Olson were so severe that he was unable to free his hands until after his spurs were free from pole, when his weight broke his hold and he fell to the ground, a distance of twenty to twenty-five feet.

*March 15.* Michael Rooney, an employee of the Sewer Department, while at work on sewer construction, corner of Haverhill and Travers streets, received a severe electrical shock, necessitating his removal to the Massachusetts General Hospital.

At the time of the accident Mr. Rooney had hold of the wire cable attached to a bucket, which was being lowered into trench, when arm of derrick used in construction with same was swung around so that it came in contact with an unused but live trolley wire of the Boston Elevated Railway, current from which passed by way of bucket cable and Mr. Rooney to ground.

*May 15.* Mr. John Kersey, a painter, while at work painting busbars in the operating-room of the Edison Electric Illuminating Company's First Station storage battery rooms, was severely burned about the face and hands as a result of a short-circuit caused by the wire binding of his paint brush coming in simultaneous contact with two busbars of opposite polarity, and a difference of potential of about 220 volts.

*August 7.* Patrick Blackburn, an inspector of the Boston Electric Light Company, lost his life while in the performance of his duties, by a fall from a pole used for the support of a street-lighting arc-lamp at the corner of K and First streets, South Boston. While making his usual rounds he had occasion shortly before 9 P.M. to ascend this pole to ascertain why lamp was not burning.

In addition to the ordinary use of this pole for supporting a street lamp, it was also in use as a distribution pole from an underground duct, the two wires leaving this pole and running overhead having a difference of potential of over five thousand volts. This construction was without the approval or knowledge of the Wire Department. Switch, which is located at base of "gooseneck" of pole, had been "thrown off," but lamp, which had ceased burning for want of trimming, had not apparently been touched. While the death of Mr. Blackburn was the result of a fractured skull, due to its coming in contact with the curbstone, when he struck, and although a careful examination of body failed to find any evidence of burns, it is highly probable, taking into consideration the conditions existing at the pole and the stormy nature of the night of the accident, that some portion of Mr. Blackburn, or his clothing, came in contact with the wires, he receiving a shock thereby sufficient to cause him to fall from pole.



SECOND STATION OF THE EDISON ELECTRIC ILLUMINATING CO.

Plate No. 22.



*Aug. 29.* Police Officer Gould received a shock when attempting to remove an obstruction placed on the sidewalk by some boys at the corner of Rutherford avenue and Miller street, Charlestown. On examination he found attached to this obstruction an iron wire, which was connected to an iron step of a wooden pole belonging to the New England Telephone and Telegraph Company. An examination of pole was made the following morning by an inspector of this Department, who found that a street railway feeder cable had been in contact with one of the iron steps higher up the pole, the underside of which step was badly burned. This step was about twenty feet above the one that Officer Gould says the wire he removed was attached to, and it is probable that the two steps were electrically connected with each other by the same boys. However that may be, the source of current from which Mr. Gould received shock was undoubtedly the feeder before mentioned, which feeder had a potential of about 550 volts above that of the ground.

*Sept. 11.* Elija Debecque, a lineman in the employ of the Boston Electric Light Company, was fatally injured by falling from pole on Massachusetts avenue, near Shirley street. A new line of poles had been recently installed by the Boston Electric Light Company on this avenue, to which it was intended to transfer wires from the old line of poles standing alongside.

Mr. Debecque, with others, was engaged in painting this new line of poles and was on pole where accident occurred for that purpose. Besides other wires the old line of poles supported a 2,000-volt alternating circuit of the Boston Electric Light Company, one wire of which in passing pole where accident occurred was in contact with an iron brace to a cross-arm of the Postal Telegraph Company, to which it was intended to transfer their wires from the old pole standing alongside, and the insulation of alternating wire was chafed where it was in contact with brace. Mr. Debecque, grasping this brace, received shocks which caused him to fall from pole to ground, his skull being fractured as a result of fall.

*Dec. 24.* Herbert James, a lineman in the employ of the Suburban Light and Power Company, while descending a pole in front of No. 35 Guild row, received an electrical shock causing him to lose his hold and fall to the ground, as a result of which fall he received a compound fracture of the skull, causing his death later.

Pole where accident occurred is owned by the New England Telephone and Telegraph Company, and is occupied by their wires, by wires of the Boston Electric Light Company, and wires of the Suburban Light and Power Company. Pole was used as a distribution point from the underground system of the telephone company, a lead-sheathed cable belonging to this company running up the side of pole.

In contact with this pole was one of the span wires of the overhead trolley system of the Boston Elevated Railway Company, which span wire, owing to a defective insulator, was in electrical connection with the trolley wire carrying current at a potential of about 550 volts above the ground. In descending pole Mr. James came in contact with span wire and with grounded lead sheath of cable, he thereby becoming part of a derived circuit, with results before stated.

*Jan. 12, 1901.* Evan A. Linde, shortly after 4 P.M., met with a fatal accident at the Boylston-street bridge, over the tracks of the Boston & Albany Railroad.

Mr. Linde, who was employed in the arc department of the Boston Electric Light Company as a "trouble hunter" and as a "spare trimmer," was sent from their Ferdinand-street station, shortly after 3 P.M., for the purpose of looking up cause of lamp, where accident occurred, not operating properly the night previous, lamp having been reported by the police as not burning.

The pole supporting this lamp was of the approved "Gilbert" type, but its insulating properties were nullified by its location, pole being set on the inner side of sidewalk on the northerly side of bridge, and against the upper chord of the metal truss of bridge, to which it was secured by several strands of No. 6 B. & S. Co. wire, about  $\frac{1}{8}$  inch below the top step of pole and about 19 inches beneath its cross-arm.

Mr. Linde was seen standing on the top chord of the truss, stooping down and looking upwards at the lamp, examining first one and then the other side of same, lamp at the time being in operation. A moment later he was seen lying on the ground and he was removed to a nearby police station, where he died a few moments later. Current was supplied for this lamp from an overhead circuit, the wires leading to and from it being fastened by two glass insulators about two and one-half feet above the truss, wires taking a turn around insulators, then twisted back on themselves, thence to cut-out for lamp. Where wires were twisted back on themselves the insulation of same was cracked on the underside, so that the conductors were exposed.

It is probable that Mr. Linde, while making his examination of lamp, placed his hand on one of the insulators, for the purpose of steadying himself, his hand thereby coming in contact with the bare conductor where insulation had cracked, and as he was standing on grounded metalwork of bridge, he formed part of a derived circuit through the ground.

Examination of the body found a burn on the inside of his left hand, and medical examiner's certificate assigned "electric shock" as the chief cause of death. Potential of circuit on which accident occurred was about 4,000 volts.



FIRST STATION OF THE EDISON ELECTRIC ILLUMINATING CO.

Plate No. 23.

## WORK OF INTERIOR DIVISION.

## Inspection of Interior Wiring of Buildings, Showing Work Performed for Five Years.

	1896.	1897.	1898.	1899.	1900.
Notices of new work received .....	4,383	4,799	5,355	5,749	5,850
Number of large area buildings.... ) Wiring completely examined .....	395	473	451	567	570
Incandescent Lights examined .....	118,679	128,857	125,458	151,046	316,074
Arc lights examined.....	2,835	2,396	2,396	2,495	5,697
Motors examined.....	908	1,121	1,027	1,225	1,922
Total H. P. of motors examined....	3,247	3,739	5,681	6,967	11,150
Defects reported.....	9,505	2,318	1,661	2,369	2,274
Defects corrected.....	8,737	1,452	926	1,846	1,622
Services examined .....		1,988	1,283	1,115	1,176
Inspections made .....			9,472	12,476	12,609
Isolated plants in this City .....					271
Isolated plants inspected .....					197

## Number and Classification of Fires, etc., due to Electrical Causes.

	1896.	1897.	1898.	1899.	1900.
Fires on outside of buildings .....	12	9	16	4	4
Fires in the interior of buildings.....	22	29	38	31	29
Fires on roofs of buildings.....	2	2	6	2	1
Fires on poles .....	3	3	6	1	7
Fires on trees.....	3	8	11	4	9
Bridge fires.....	2	1	4	2	3
Burn-outs.....	2	3	....	....	6
Deaths.....	3	3	....	3	4
Injuries .....	13	16	....	16	4
Manhole explosions .....	2	5	....	5	1
Miscellaneous .....	21	11	5	2	3
Electric car fires.....	....	23	1	....	....
Fires at standpipes for distribution .....	....	....	2	1	1
Fires in underground services.....	....	....	3	....	1

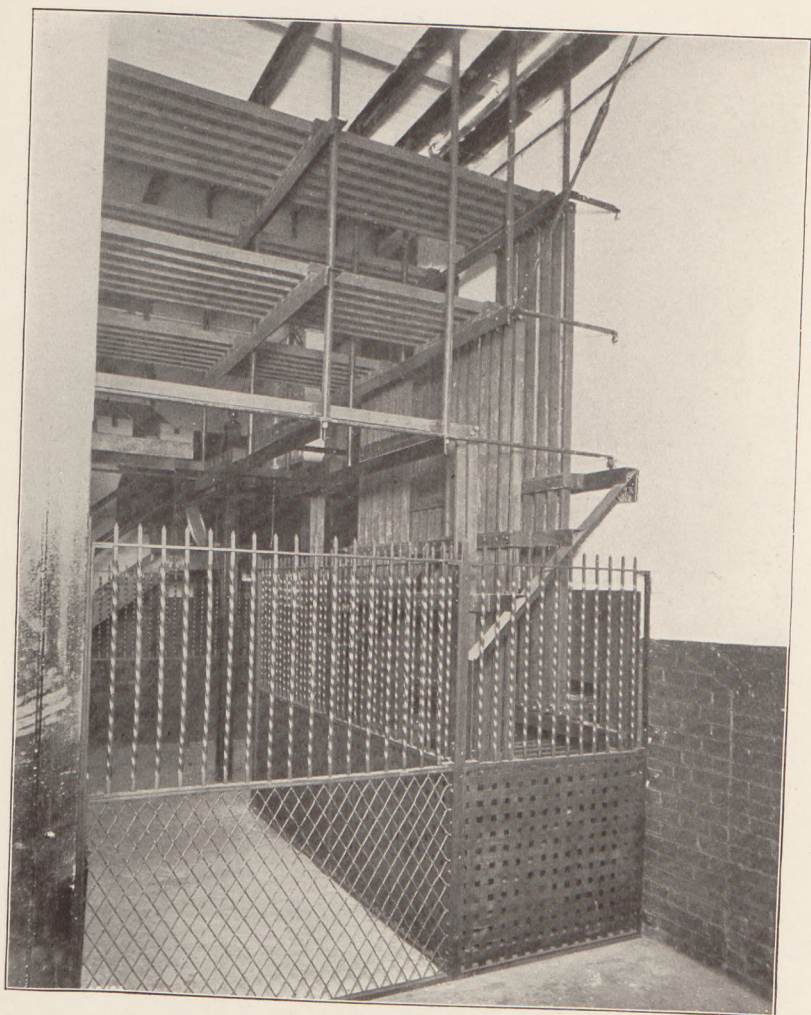
NOTE. — Electric car fires not noted, 1899 and 1900.

DESCRIPTION OF THE LABORATORY AND TESTING APPARATUS  
INSTALLED UNDER THE SUPERVISION OF CONSULTING  
ELECTRICIAN WILLIAM BROPHY.

A commodious room, thirty-three by sixteen feet, giving a floor space of five hundred and twenty square feet, has been provided for the laboratory, which will contain a test-board that has long been in the possession of the Department, but has for a long time been out of use, because the room in which it was located had to be occupied for other purposes. On it will be tested the carrying capacity of wire, fuses, switches, and many other devices. Its range is from thirty-six one hundredths (0.36) of an ampere to one hundred and twenty-five (125) amperes, and this can be increased to three hundred and ninety-three (393) amperes. Next will be a five kilowatt motor and generator. The generator will furnish alternating current at a pressure of two hundred and twenty (220) volts to a step up transformer whose secondary coils can produce current at a pressure of fifty thousand (50,000) volts, so that we will have a range of from two hundred and twenty (220) to fifty thousand (50,000) volts. With this apparatus, every device, and all material used in electrical construction, can be put under any stress that may be required at the present time, and, so far as is now known, for a long time in the future. By this means the value of any so-called high-grade insulating material can be quickly determined. Next will be a transformer, mounted on the switch-board, by means of which a current of one thousand (1,000) amperes can be generated. By this means the carrying capacity of wire switches, cut-outs, fuses, etc., can be quickly determined, together with the amount of current required to heat conductors to a dangerous point, or melt them.

Next will be the apparatus for the accurate measurement of the insulation and conductivity of conductors, consisting of a delicate reflecting galvanometer, which will set on a brick pier which is built on piles driven twenty feet into the marshy ground on which the building stands in order to secure a solid foundation and prevent vibration, in connection with which is a Wheatstone bridge for the measurement of conductivity, a standard resistance-box, condenser, shunt coils, and testing battery, switches, keys, etc. On a table, the top of which is slate, will be mounted all these instruments except the galvanometer.

A slate switch-board will contain the main switch for controlling the current to the motor, a double throw switch for connection to the dynamo that furnishes light to the building or to the wires of one of the electric lighting company, an automatic circuit breaker, starting rheostat for the motor, and another for controlling the output of the generator, together with voltmeters and ammeters for the measurement of the pressure in volts and the quantity of current in amperes. This board



FIRST STATION OF THE EDISON ELECTRIC ILLUMINATING CO.

consists of two panels, on the second of which will be mounted the quantity transformer before mentioned, together with the necessary instruments for regulating the current and measuring the same. At one end of the room is a large water tank for the immersion of material whose action under such conditions it is necessary to determine.

During the year photographs have been taken showing the improvements made in overhead and underground construction. Also defective installation of interior wiring, etc. Maps drafted, showing the congested condition of the streets in the City Proper, all of which form an invaluable record of the work done, and are kept in the archives of the Department for future reference and use.

*Plate No. 1.* Shows a conduit in process of construction of the Edison Electric Illuminating Company, composed of 120-3 inches vitrified clay ducts, and is laid in the privateway approaching the new station of this company on Atlantic avenue, opposite Pearl street.

*Plate No. 2.* Shows a conduit in process of construction of the Massachusetts Telephone and Telegraph Company on Franklin street, composed of 72 ducts of 3 inch vitrified clay. The manhole which is partially built is in front of the building occupied by the above company, namely, No. 185 Franklin street.

*Plate No. 3.* Was taken at the time of the break in the water main at Tremont and Boylston streets, showing the crack in the water-pipe and the condition in which the electrical pipes and cables were found. It will be noticed that the pipe was completely stripped off the cable in some places, but more of the cables were broken through, though it will be seen that the lead sheathing is badly cracked in many places. In this case it was necessary to relay some 300 feet of conduit.

*Plate No. 4.* Gives a fair idea of the manner of stringing the feed and return cables of the Boston Elevated Railway Company on their overhead structure, showing the cross-pieces between the tracks and glass insulators supporting the wires.

*Plate No. 5.* Shows the method of dividing the feed and return cables and anchoring the same in order to pass around the stations; this photograph was taken at the southern end of the Northampton-street station.

*Plates Nos. 6, 7, 8, 9, 10.* Showing portions of streets from which poles and wires are now being removed.

All in the prescribed district for the year 1900.

*Plates Nos. 11, 12.* Showing condition of electric light and power wires in area near Washington and Bromfield streets. These wires were in contact with fire escapes, copper gutter, iron work of building, etc., and owing to their dangerous condition were cut and removed by this Department, as mentioned elsewhere.

Relating to the map, showing the congested condition under

the surface of State street, I would say that between Broad and Congress streets, in addition to sewer, water, and gas pipes, there are 67 ducts, containing 8,564 conductors, used for electrical purposes of all descriptions.

*Plate No. 13.* Shows a group, consisting of a switch, fuseless rosette, cut-out, and pieces of an elevator cable, removed from No. 105 Summer street, where they were in use previous to a fire which occurred March 15, noted in this year's list of fires due to electricity. One side of system was grounded, a second ground occurred where switch in elevator car was fastened to ironwork of same, and as cut-out had copper wire in same, in place of proper fuses, elevator cable was heavily overcharged, its insulation ignited, portions of which dropped to the bottom of the elevator well, igniting loose paper and rubbish which had accumulated there.

*Plate No. 14.* Shows two sockets, metal portions of which are badly fused, as a result of short circuits which occurred within them; also shows two copper wires, which were removed by an inspector of this Department from cut-out, intended to protect circuit of which these sockets were a part.

*Plates Nos. 15 and 16.* Show the effects of electrolytic salts and action on wires, and their insulation. Plate No. 15 shows the wires as the inspector found them in service, one of the wires so badly affected by electrolytic action that in one place it was almost corroded off. Wire was dangerously hot at this point, as its area had been so reduced that it had not sufficient carrying capacity for amount of current on circuit of which wire was a part. Plate No. 16 shows two of these same wires after they had been removed.

*Plate No. 17.* Shows two pieces of lead-sheathed cables, taken from a 500-volt and a 2,000-volt circuit. These cables were run side by side, boxed for a short distance, after leaving standpipe from underground system, and the conductors of same were brought in electrical connection with each other by nails accidentally driven through lead sheaths and insulation until they brought conductors in electrical connection with their respective lead sheaths, which, in turn, were in direct contact with each other. This accidental connecting of the two circuits together resulted in the burning out of over 63 motors, with a total horsepower of 297½. Accident occurred last year.

*Plate No. 18.* Shows a cut-out almost completely covered with rat deposits and shavings. Cut-out was found in a prominent hotel, where extensive changes have been made in electrical equipment at the request of this Department.

*Plate No. 19.* Shows a 500-volt motor and a "home-made" speed regulator consisting of a number of coils of fine bare wire strung by means of strings, nails, etc., to wall and ceiling in vicinity of motor. Current was cut out of premises and was not permitted to be turned on again until installation was made satisfactory.



*Plate No. 20.* Shows cut-out from which a 220-volt lighting circuit was fed at the Back Bay Station of the N. Y., N. H. & H. R.R. It also shows a butt of a lamp with a portion of a socket fused to same.

A short-circuit occurred in lamp socket, and although cut-out had only 10 ampere fuses in same, a destructive arc was maintained across cut-out and insulation of wires was ignited. Watchman was placing lamp in socket when the short-circuit occurred, and fire was extinguished by him.

*Plate No. 21.* Shows pieces of pipes and wires which were removed from buildings Nos. 22-32, Nos. 23-25, and Nos. 48-50 Pearl street, where they were damaged March 1, by heavy currents of electricity which entered buildings over service gas-pipes.

*Plate No. 22.* Shows feeder construction from cable vault at the Second Station of the Edison Electric Illuminating Company. This picture shows the type of construction which was in use at the First Station previous to the burn-out of October 11.

*Plate No. 23.* Shows feeder bus-bar construction, installed at the First Station of the Edison Electric Illuminating Company, to replace cable construction destroyed by burn-out of October 11. This plate shows construction where cables leave underground ducts and connect to bus-bar feeders.

*Plate No. 24.* Shows feeder bus-bar construction, installed at the First Station of the Edison Electric Illuminating Company, to replace the cable construction destroyed by burn-out of October 11. This plate shows that part of cable vault where burn-out occurred.

## LIST OF EMPLOYEES, JANUARY 31, 1901.

No.	Occupation	Salary Per. Annum.
1	Commissioner . . . . .	\$5,000
1	Consulting Electrician . . . . .	3,000
2	Chief Inspectors . . . . .	2,000
6	Deputy Inspectors . . . . .	1,300
2	Deputy Inspectors . . . . .	1,200
1	Deputy Inspector . . . . .	1,000
1	Chief Clerk . . . . .	1,300
1	Clerk . . . . .	624
1	Draughtsman . . . . .	1,300
5	Linemen . . . . .	936
11	Linemen . . . . .	858
1	Lineman . . . . .	819
2	Linemen . . . . .	780
1	Lineman . . . . .	728
1	Telephone Operator . . . . .	468

STATEMENT OF DEPARTMENT APPROPRIATION  
AND EXPENDITURES FROM FEBRUARY 1, 1900,  
TO JANUARY 31, 1901.

Annual appropriation . . . . .	\$43,000 00	
By transfer . . . . .	4,199 00	
	<hr/>	<u>\$47,199 55</u>

Expenditures:

Office, including salary of Commissioner . . . . .	\$12,593 33	
Exterior Division . . . . .	18,006 92	
Interior Division . . . . .	13,288 57	
Draughting, including plates for report . . . . .	796 90	
Electrical instruments . . . . .	1,635 61	
Stationery and printing . . . . .	366 71	
Telephones . . . . .	219 94	
Incidental expenses . . . . .	175 09	
Tools and repairs . . . . .	116 48	
	<hr/>	<u>\$47,199 55</u>

LIST OF PROPERTY OF THE WIRE DEPARTMENT.

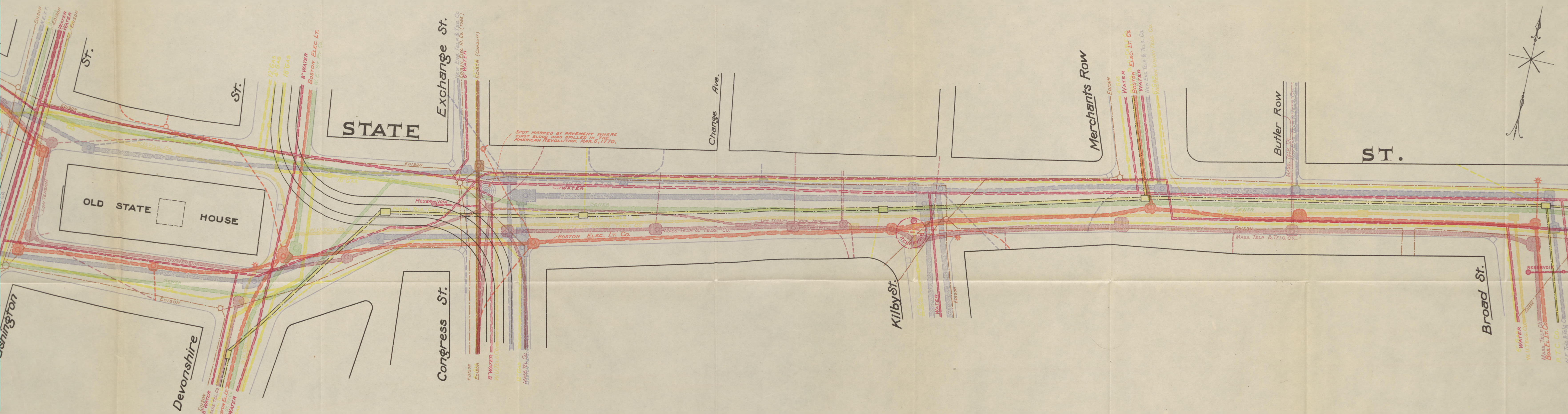
- 1 High Potential Testing Apparatus.
- 1 Standard Resistance Coil with Wheatstone Bridge.
- 1 Transformer.
- 1 Test Board, capacity 220 volts and 300 amperes.
- 1 Auxiliary Test Board, capacity 220 volts and 150 amperes.
- 1 Auxiliary Test Board, capacity 220 volts and 75 amperes.
- 1 Weston Direct Reading Voltmeter, No. 3,317,300 volts.
- 1 Weston Direct Reading Voltmeter, No. 4,747, 15 volts.
- 1 Weston Direct Reading Ammeter, No. 926,150 amperes.
- 1 Weston Direct Reading Voltmeter, No. 3,438, 1,500 volts.
- 1 Weston Direct Reading Mil-Ammeter, No. 2,433, 1,500 mil-amperes.
- 1 Weston Direct Reading Voltmeter, No. 6,020,300 volts.
- 1 Weston Direct Reading Ammeter, No. 2,428, 500 amperes.
- 1 Standard Portable Alternating and Direct Current Voltmeter, No. 1,044, 300 volts.
- 1 Reflecting Galvanometer, Condenser, Telescope, Scales, etc.
- 2 Bichloride of Silver Batteries, 150-cell and 60-cell.
- 1 Queen testing set, No. 389.
- 1 Weston Direct Reading Ammeter, No. 2,381, 50 amperes.
- 1 Set Standard Resistance Coils.
- 1 Generator, 50,000 ohms.
- 1 Discharge Key.
- 1 Reversing Key.
- 1 Lamp-stand and Scale.

- 1 Shunt Coil.
- 1 Set Double Connector Posts.
- 2 Horses.
- 2 Express Wagons.
- 1 Business Wagon.
- 1 Sleigh.
- 3 Sets of Harness.
- 2 Robes.
- 6 Blankets.

Miscellaneous Tools, used in connection with overhead construction.

Draughting Instruments.





# WIRE DEP'T., CITY OF BOSTON

PLAN SHOWING UNDERGROUND STRUCTURES AND THE DIFFICULTIES ENCOUNTERED IN LAYING CONDUIT IN OUR "DOWN TOWN" STREETS.

*William H. Lott*

COMMISSIONER OF WIRES.

JANUARY 21st. 1901.

NOTE, THIS PLAN COMPILED FROM OTHER PLANS AND NONE OF THE INFORMATION IS GUARANTEED BY THE WIRE DEPARTMENT.

JAMES T. BALL, DRAUGHTSMAN.

