TWENTY-FIRST ANNUAL REPORT

OF THE

FIRE DEPARTMENT

OF THE

CITY OF BOSTON,

FROM

FEBRUARY 1, 1893, TO JANUARY 31, 1894.

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ROCKWELL AND CHURCHILL, CITY PRINTERS.
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Boston - Fire Commrs.

Nov. 24, 1897.

To. Cat.

21st report.

Office of the Board of Fire Commissioners,
Old Court-House, Boston, February 1, 1894.

Hon. Nathan Matthews, Jr.,
Mayor of the City of Boston:

Sir: The Fire Commissioners herewith respectfully submit their twenty-first annual report of the work done by this department for the year ending January 31, together with certain recommendations looking to the extension and larger efficiency of the service.

Alarms and Losses.

The department year has been a very busy one. The resources available for the extinguishment of fires have been severely taxed, and the necessity of substantially strengthening them has been emphasized. There have been 1,718 alarms, an increase of 306 over the year previous, and considerably more than double the annual average eight and nine years ago. This means more than a twofold increase in actual fire duty as compared with a few years ago, and a corresponding increase in the work of administering the economic and disciplinary affairs of the department. The losses on buildings and contents amount to $4,348,902, the lion's share of which is due to the conflagration of March 10, on Lincoln street and vicinity, whose sudden and sweeping character and large proportions are vividly remembered, as should also be the lessons and warnings as to building construction and arrangement that were written in such glowing characters by that event.

Standing of the Department.

The story of department enlargement is a very short one. There is little to add in this respect to what was stated in last year's report. The new headquarters are very near completion, and will soon be ready for occupancy by the Commissioners and Chief at least, and in the course of a few months it is hoped to install therein a new fire-alarm plant that shall embody the latest and best features in this important branch of fire-service. Quite a handsome house at Ashmont will soon be ready for apparatus, and help to fill a gap in the fire protection of that section that is now alto-

gether too large. No advance has been made toward the location and construction of a horse sanitarium, and the city is still paying rent for quarters that are far from satisfactory for this particular purpose. An appropriation of $50,000 has been made for a new fire-boat, and the commissioners have set about securing the necessary plans and specifications to give this sum practical utility as soon as possible. This piece of apparatus will constitute, when completed, a very valuable reënforcement.

There is a great deal that needs to be done at the present time for the better protection of the city. The Boston and Maine system of railroads has already added sufficient hazard in Charlestown to make necessary another engine company somewhere in the vicinity of Prison Point, and the risk there is constantly increasing. An engine is needed somewhere near Day street, in Roxbury. At Grove Hall the city has for several years owned a site for a ladder and chemical engine house, but there is no money to proceed with the work. Chemical engines are needed in West Roxbury, Dorchester, and East Boston. A beginning has been made toward rebuilding the house of Ladder 1, but there is the same need for replacing the house of Ladder 13 with a new one. The sum of $300,000 could be expended at the present time for new houses and apparatus without exceeding in the slightest the legitimate needs of the department.

There are two matters of a very practical nature now before the City Council, of which the Board would ask very careful consideration. One is a request to petition the Legislature for authority to cause buildings of a certain class to be equipped with metallic ladders and stand-pipes, the same as in certain Western cities, where their value has been demonstrated many times over. The other is the proposition to run 12-inch pipes into the conflagration district from the harbor, for which the fire boat or boats will supply the power. The Board has made no suggestions that promise more protection for less money than these, and the sooner these systems are established the better it will be for all most deeply interested. Boston is behind even some of her smaller sister cities in these important respects.

Since the reorganization of the department, twenty years ago, there has been no rearrangement of the fire districts except in some slight details. The number has not been increased, and it must be evident to all that with the great growth of Boston during that time, the old system has become unwieldy in some of its parts, and not as convenient as it should be in its operations. For instance, District 10 includes half the territory of the city, and District 8 is not

well arranged for the best service of a single chief. This matter has been the subject of frequent discussion by the Commissioners, and only lack of means has prevented them from making the changes which their judgment has so strongly urged.

Apparatus, Equipment, etc.

The department is not relatively as strong in apparatus as it was a year and a half ago. It is sound policy on the part of business concerns employing machinery to charge a certain considerable percentage each year to depreciation; and, certainly, a fire department, which has at times to give its machinery exceptionally hard usage, cannot be exempt from this rule. No apparatus, in the strict sense of the term, has been purchased for about a year and a half; and, although the repair-shop has kept the present supply in good working condition, a yearly addition is necessary to prevent the department from falling behind. There are needed at the present time three new first-size steam-engines, an aerial ladder truck, a chemical engine, etc. What could be done at comparatively small expense to help the material part of the service has been done. More three-horse hitches have been put in, and, where practicable, two-horse hitches have been placed on the down-town hose wagons, thus enabling the companies to carry a larger amount of hose. A water-tower attachment has been made to each of the aerial ladders, and a few coal and hose wagons have been purchased. A wrecking wagon has been ordered, which will be a unique but valuable feature of the service.

Constitution of the Force.

The men employed in various capacities to run the department number a trifle over 800. Of these, about 600 are permanent firemen and 120 call men. The complaints that come from some sections of weakness in the companies appointed to protect their property can never be measurably satisfied until we have permanency throughout. The Commissioners dislike to renew their annual protest against a continuance of the call system, but they consider it their duty to do so, knowing that it is out of place and an element of weakness in a large city department. As has been said before, the call men are all right, but the call system is all wrong, at least for Boston. The drill and engine schools have done good work, and a high degree of discipline and efficiency prevails throughout the force.

Inspection of Wires.

The work of this bureau is given in detail elsewhere, and shows a busy record for the year. Legislation is now in process which promises to relieve the city in a few years of the incubus of the overhead system of wires; and, certainly, nothing can be done that will be more welcome to this department. The wires have been among the most serious obstacles against which it has had to contend, and, to a greater extent than is known, the cause of many of the battles it has had to wage.

Horses.

The city owns 237 horses, and has in extra service, for winter use, 60 more. During the year, 37 new horses were purchased, 23 sold or exchanged, 5 died, of which 2 were killed. The number of horses receiving treatment was 185, resulting in 350 cases, of which 150 were treated at the Horse Infirmary, and 15 were horses received for extra service. The horses of the department have been, and are, in generally excellent condition. During the year a horse-shoeing shop has been established at the Infirmary, and considerable work has been and is being done there.

The Department Allies.

The Board desires to thank the police for their cordial and efficient assistance. It has been the policy the past year to extend the fire-lines more than formerly, thus making their duties somewhat more exacting; but they have acted well up to the measure of their responsibility. The Fire Marshal's office has made a good record, and proved again its value as a coöperative bureau; and the Protective Department has shown its usual promptness and efficiency.

The Board of Fire Commissioners

consists of three members. One member is appointed annually, for a term of three years from the first Monday in May each year. The nomination is made by the Mayor, subject to confirmation by the Board of Aldermen.

Robert G. Fitch, *Chairman*, for three years from May, 1892. Term expires May, 1895.

John R. Murphy, for three years from May, 1891. Term expires May, 1894.

George H. Innis, for three years from May, 1893. Term expires May, 1896.

Salaries, $3,500 each.

Benjamin F. Underhill, Jr., *Clerk*. Appointed by the Fire Commissioners. Salary, $2,400.

Chief of Department.

Lewis P. Webber, Headquarters, Old Court-House.

District Chiefs.

John F. Egan,	Headquarters,	Engine-house	9.
C. H. W. Pope,	"	Ladder	9.
Lewis P. Abbott,	"	Engine-house	25.
Wm. T. Cheswell,	"	"	4.
John W. Regan,	"	"	26.
John A. Mullen,	"	"	1.
Patrick E. Keyes,	"	"	3.
Edward H. Sawyer,	"	Hose-house	7.
Williston A. Gaylord,	"	H. and L. house	4.
J. Foster Hewins,	"	Engine-house	18.

Clerks.

A. Charles Scott, Wm. E. Delano, Wm. McSweeney, M. J. Lafferty, Geo. F. Murphy.

D. J. Quinn, *Messenger*.

Force and Pay-Roll.

As established by the Board.

1	Chief of Department	$3,500	per annum.
1	Assistant Chief and Inspector of Hose and Harnesses	2,400	"
9	District Chiefs	2,000	"
1	Superintendent of Apparatus Repairs	2,000	"
1	Clerk	1,500	"
2	Clerks	1,000	"
1	Clerk	800	"
1	Clerk	600	"
1	Messenger	1,000	"

1	detailed man as Clerk, Apparatus Repair-shop	$750	per annum.
1	Veterinary Surgeon	1,800	"
50	Captains	1,600	"
33	Lieutenants	1,400	"
41	Engine-men	1,300	"
286	Permanent Men	1,200	"
53	" "	1,100	"
28	" "	1,000	"
44	Call Men	250	"
41	" "	200	"
42	" "	175	"
55	Permanent Substitutes	900	"
23	" "	720	"
4	Call Captains	325	"
1	Hostler	624	"
2	Watchmen	1,000	"

Fire Districts.

The city is divided into ten fire districts, as follows:

District 1. — Comprises all that part of Boston known as East Boston.

District 2. — All that part of Boston formerly known as Charlestown.

District 3. — All that part east of a line beginning at the Charles-river drawbridge, and running through the centre of Charlestown street, Haymarket square, and Washington to Summer street, and north of Summer street and the N.Y. & N.E. R.R. passenger depot to the water.

District 4. — All that part west of District 3, and north of a line running through the centre of Winter and Park streets, and west of Beacon, to Arlington street, west side of Commonwealth avenue, to Chester Park, to water.

District 5. — All that part south of Districts 3 and 4 to the centre of Dover-street drawbridge, and a line running through the centre of Dover, Berkeley, Boylston, east side of Commonwealth avenue, to Arlington, to Boylston street.

District 6. — All that part of Boston known as South Boston, and divided from District No. 9 by Locust and Dorset streets.

District 7. — All that part of Boston south of District 5, through the centre of Dover street, to the drawbridge; thence by water to the centre of East Chester park; thence through the centre of Albany and Northampton streets, Columbus avenue, West Chester park to east side of Commonwealth avenue to centre of Berkeley and Dover streets to the point of starting.

District 8. — All that part south and west of District 7 to the boundary line of West Roxbury, and west of Washington street to the Brookline boundary line, and including all of Ward 25, formerly Brighton.

District 9. — All that part south of Districts 6 and 7 to West Roxbury line, running through the centre of Seaver street, Blue Hill avenue, Columbia, Geneva avenue, Olney, Bowdoin, Hancock, Freeport streets, to corner of Dorchester avenue, thence due east to the water.

District 10. — All the southerly part of Boston south of Districts 8 and 9, including West Roxbury.

ASSIGNMENT OF DISTRICTS.

Each district is placed under the charge of a District Chief, as follows:

District.	Chief in Command.	COMPANIES IN DISTRICT.			
		Engines.	Chemical Engines.	Hook and Ladder.	Hose.
1	John F. Egan	5, *9, 11, 40	7	2	. . . . .
2	C. H. W. Pope	27, 32, 36	9	*9	3
3	Lewis P. Abbott	8, *25, 31	. . . . .	8, 14	. . . . .
4	Wm. T. Cheswell	Tower 1, *4, 6, 10	1	1	8
5	John W. Regan	7, *26, 35	2	17	. . . . .
6	John A. Mullen	*1, 2, 15, 38, 39, 43	C.W. 2, 8	5	. . . . .
7	Patrick E. Keyes	*3, 22, 23, 33, Tower 2	. . . . .	3, 13, 15	5
8	Edward H. Sawyer . . .	13, 14, 29, 34, 37, 41	3, 6	11, 12	*7
9	Williston A. Gaylord . .	12, 17, 21, 24, 42	5, 10	*4, 7	. . . . .
10	J. Foster Hewins	16, *18, 19, 20, 28, 30	C. W. 1	6, 10, 16	. . . . .

* Headquarters of District Chief.

WATER AND HYDRANTS.

The total number of hydrants in the city February 1 was 6,373. In addition to these hydrants there are 238 fire reservoirs in different sections of the city that contain from 300 to 500 hogsheads of water, and can be used in an emergency.

The number of hydrants established and abandoned during the year is as follows:

	ESTABLISHED.					ABANDONED.					
	Lowry.	Post.	Boston Lowry.	Boston.	Total.	Lowry.	Post.	Boston Lowry.	Boston.	Total.	Net Increase.
Boston (City Proper)	20	20	2	. .	42	2	1	4	8	15	27
South Boston	4	6	2	. .	12	1	. .	1	3	5	7
Roxbury	2	32	2	4	40	6	. .	4	6	16	24
Dorchester	3	61	6	. .	70	2	1	9	5	17	53
W. Roxbury	4	54	13	. .	71	1	. .	6	2	9	62
Brighton	2	14	4	. .	20	. .	1	4	. .	5	15
Rainsford Island	. .	. .	. .	1	1	. .	. .	. .	. .	. .	1
Charlestown	4	. .	. .	. .	4	. .	. .	. .	. .	. .	4
Total	39	187	29	5	260	12	3	28	24	67	193

Total Number of Hydrants in Use January 31, 1894.

	Lowry.	Post.	Boston Lowry.	Boston Y.	Boston.	Total.
Boston (City Proper)	691	246	66	. . .	510	1,513
South Boston	214	93	21	1	259	588
East Boston	138	84	24	. . .	138	384
Roxbury	663	195	63	. . .	95	1,016
Dorchester	575	423	184	. . .	67	1,249
West Roxbury	122	468	166	. . .	48	804
Brighton	79	269	59	. . .	36	443
Deer Island	. . .	16	. . .	. . .	. . .	16
Brookline	5	. . .	. . .	. . .	3	8
Chelsea	. . .	. . .	. . .	. . .	7	7
Quincy	. . .	7	. . .	. . .	. . .	7
Long Island	. . .	4	. . .	. . .	. . .	4
Thompson's Island	. . .	2	. . .	. . .	. . .	2
Rainsford Island	. . .	. . .	. . .	. . .	1	1
Charlestown	205	58	33	. . .	38	334
	2,692	1,865	616	1	1,202	6,376

In all cases the Water Board have cheerfully complied with the requests of this Board in the establishment of hydrants, whenever necessity required.

The following property is in charge of the Board of Commissioners of the Fire Department:

ENGINE-HOUSES.

	Location.	No. of feet in lot.	Remarks.
No. 1 . . .	Dorchester street	5,698	Addition built, 1874. Municipal Court, South Boston, and two classes, Bigelow School, in this building.
2 . . .	Cor. of O and Fourth streets .	4,000	
3 . . .	Bristol st. and Harrison ave. .	4,000	Ladder No. 3 in this building.
4 . . .	Bulfinch street	6,098	Chemical Engine No. 1, Laucers' Armory, and water-tower in this building.
5 . . .	Marion street, E.B.	1,647	
6 . . .	Leverett street	. . . . .	
7 . . .	East street	1,893	
8 . . .	Salem street	2,568	
9 . . .	Paris street, E.B.	4,000	Reconstructed, 1890-91. Ladder No. 2 in this building.
10 . . .	River street	1,886	
11 . . .	Saratoga and Byron streets . .	10,000	
12 . . .	Dudley street	7,161	
13 . . .	Cabot street	4,305	Remodelled, 1870.
14 . . .	Centre street	5,627	
15 . . .	Dorchester avenue	2,843	
16 . . .	River street, Dorchester Dist.	12,736	Ladder No. 6 in this building.
17 . . .	Meeting-house Hill, Dorchester Dist.	. . . . .	Ladder-House No. 7 on this lot.
18 . . .	Harvard street, Dor. Dist. . .	10,225	
19 . . .	Norfolk street, " . .	7,683	
20 . . .	Walnut street, " . .	9,000	
21 . . .	Boston street, " . .	9,355	
22 . . .	Dartmouth street	4,463	
23 . . .	Northampton street	3,445	
24 . . .	Cor. Warren and Quincy sts. .	4,186	
25 . . .	Fort Hill square	4,175	Ladder No. 8 and Ladder 14 in this building.
26 . . .	Mason street	6,385	Engine No. 35 in this building.
27 . . .	Elm street, Charlestown Dist.,	2,600	
28 . . .	Centre street, W. Roxbury District	10,377	Ladder No. 10 in this building.
29 . .	Chestnut Hill ave., Brighton District	14,356	Ladder No. 11 in this building.
30 . . .	Mt. Vernon street, West Roxbury District	16,275	
32 . . .	Bunker Hill street	8,000	Built, 1883-84.
33 . . .	Cor. Boylston and Hereford streets	5,646	Ladder No. 15 in this building.

ENGINE-HOUSES. — *Concluded.*

	Location.	No. of feet in lot.	Remarks.
No. 34 . . .	Western ave., Brighton.		
36 . . .	Monument street	5,668	
37 . . .	Cor. Longwood and Brookline avenues	5,400	Occupied by Chemical Eng. No. 3.
38–39 .	Congress street.		
40 . . .	Sumner st., East Boston . . .	4,010	
41 . . .	Harvard ave., near Cambridge street, Brighton District . .	6,112	Chem. Eng. 6 in this building; built in 1892.
42 . . .	Washington street, between Atherton and Beethoven . .	3,848	Chem. Eng. 5 in this building; built in 1892.
43 . . .	Andrews square	5,225	
	CHEMICAL ENGINE-HOUSES.		
No. 1 . . .	Bulfinch street	. . . . .	See Engine house 4.
2 . . .	Church street	3,412	
3 . . .	Cor. Longwood and Brookline avenues	. . . . .	See Engine-house 37.
Comb'ation Wagon 1 .	Poplar st., cor. of Washington, West Roxbury	14,729	Ladder No. 16 in this building.
No. 5 . . .	Washington street, between Atherton and Beethoven . .	3,848	Engine No. 42 in this building.
6 . . .	Harvard ave., near Cambridge street, Brighton District . .	6,112	Engine No. 41 in this building.
7 . . .	Chelsea street, East Boston . .	1,346	
8 . . .	B street	1,804	
9 . . .	Main street	. . . . .	See Ladder-house 9.
10 . . .	Eustis street	700	

HOSE-HOUSES.

	Location.	No. of feet in lot.	Remarks.
No. 3 . . .	Winthrop street	5,230	Armory in building.
5 . . .	Shawmut avenue	889	
7 . . .	Tremont street	4,350	Ladder No. 12 in this building.
8 . . .	North Grove street	3,918	
Comb'ation Wagon 2 .	Fourth street	3,101	Remodelled, 1870.

HOOK-AND-LADDER HOUSES.

	Location.	No. of feet in lot.	Remarks.
No. 1 . . .	Friend street	1,676	
2 . . .	Paris street, East Boston . . .	. . . . .	See Engine-house 9.
3 . . .	Harrison avenue	. . . . .	See Engine 3.
4 . . .	Dudley street	3,923	
5 . . .	Fourth street	2,469	
6 . . .	River street, Dorchester . . .	. . . . .	See Engine-house 16.
7 . . .	Meeting-house Hill	. . . . .	See Engine 17.
8 . . .	Fort Hill square	. . . . .	See Engine Co. 25.
9 . . .	Main street, Charlestown . . .	2,430	Chemical 9 in this building.
10 . . .	Centre street, W.R.	. . . . .	See Engine-house 28.
11 . . .	Chestnut Hill ave., Brighton District	. . . . .	See Engine-house 29.
12 . . .	Tremont street	. . . . .	See Hose-house 7; rebuilt 1892.
13 . . .	Washington, near Dover street,	1,007	
14 . . .	Fort Hill square	. . . . .	See Engine-house 25.
15 . . .	Boylston, cor. Hereford street,	. . . . .	Engine 33 in this building.
16 . . .	Roslindale	. . . . .	See Combination Wagon 1.
17 . . .	Harrison avenue	. . . . .	Built in 1892.

Fuel-house, Salem street, 417 feet of land.
Fuel-house, Main street, Charlestown, 1,592 feet of land.
Repair-shop, corner of Albany and Bristol streets, 20,547 feet.

HOSE.

Amount of hose purchased and condemned since February 1, 1893, to January 31, 1894, is as follows:

	Purchased.	Condemned.
Leading, Cotton,	14,000 feet.	13,850 feet.
" Rubber,	3,000 "	3,450 "
Chemical,	1,000 "	1,350 "
Suction,	143 "	123 "
Total,	18,143 "	18,773 "

Amount of hose in use and in storehouse February 1, 1894:

	In use.	In storehouse.
Cotton,	60,547 feet.	9,100 feet.
Rubber,	5,188 "	1,550 "
Chemical,	4,745 "	500 "
Suction,	977 "	118 "
Hand,	3,061 "	
Total,	74,518 "	11,268 "

Recapitulation of the Number of Alarms of Fire, and the Losses and Insurance on the same, from

	Alarms.	Losses.	Insurance.	Population.
Sept. 1, 1829, to August 31, 1830	110	$118,540	$52,750	61,392
" 1830, " 1831	62	23,620	4,320	
" 1831, " 1832	89	68,195	40,975	
" 1832, " 1833	159	74,613	25,713	
" 1833, " 1834	130	69,405	37,925	
" 1834, " 1835	109	107,440	45,970	78,603
" 1836, " 1837	159	130,295	55,125	
" 1837, " 1838	105	32,118	20,238	
" 1838, " 1839	96	140,004	61,191	
" 1839, " 1840	113	77,973	58,632	85,000
" 1840, " 1841	140	102,975	36,920	
" 1841, " 1842	194	102,118	44,533	
" 1842, " 1843	232	128,666	90,086	
" 1843, " 1844	267	164,083	95,252	
" 1844, " 1845	223	234,591	169,440	114,366
" 1845, " 1846	289	226,338	155,205	
" 1846, " 1847	270	172,973	87,159	
" 1847, " 1848	282	222,273	162,085	
" 1848, " 1849	339	300,525	216,992	
" 1849, " 1850	240	123,660	76,197	138,788
" 1850, " 1851	333	386,107	192,937	
" 1851, " 1852	169	402,849	215,315	
" 1852, " 1853	205	515,167	295,056	
" 1853, " 1854	195	150,772	106,880	
" 1854, " 1855	174	537,604	361,047	160,508
" 1855, " 1856	167	409,353	287,832	
" 1856, " 1857	164	258,231	233,787	
" 1857, " 1858	161	390,657	316,207	
" 1858, " 1859	166	761,370	646,210	
" 1859, " 1860	194	521,383	471,853	177,902
" 1860, " 1861	172	617,213	405,928	
" 1861, " 1862	172	1,107,569	806,433	
" 1862, " 1863	141	367,429	120,909	
" 1863, " 1864	188	858,381	493,369	
" 1864, " 1865	131	559,749	318,067	
" 1865, " 1866	221	681,554	474,171	192,324
" 1866, to Dec. 31, 1866	64	408,560	383,700	

Recapitulation. — *Concluded.*

	Alarms.	Losses.	Insurance.	Population.
Jan. 1, 1867, to Dec. 31, 1867	284	$402,115	$340,775	
" 1868, " 1868	293	401,106	314,706	250,750
" 1869, " 1869	385	447,723	335,975	
" 1870, " 1870	497	855,571	786,463	
" 1871, " 1871	549	704,329	534,991	
" 1872, " 1872	640	[1] 1,516,549	1,293,983	
" 1873, " 1873	620	2,680,953	2,010,633	
" 1874, to April 30, 1874	291	941,483	1,607,782	
May 1, 1874, " 1875	702	1,228,403	3,677,008	342,000
" 1875, " 1876	483	541,272	3,076,483	
" 1876, " 1877	509	481,354	2,827,528	
" 1877, " 1878	514	516,000	3,803,910	
" 1878, " 1879	563	403,451	3,591,948	
" 1879, " 1880	571	1,260,490	4,602,591	
" 1880, " 1881	731	1,183,818	6,543,006	362,000
" 1881, " 1882	595	615,836	4,849,246	
" 1882, " 1883	727	814,154	7,299,353	
" 1883, " 1884	793	998,554	7,981,807	
" 1884, " 1885	927	1,593,393	8,068,295	
" 1885, " 1886	785	821,848	7,082,541	
" 1886, " 1887	827	911,999	6,771,654	
" 1887, " 1888	975	784,667	10,165,625	
" 1888, " 1889	962	1,078,333	12,146,904	
" 1889, " 1890	963	4,746,869	16,023,952	
" 1890, to Jan., 1891	679	556,597	9,397,054	449,000
Jan. 1, 1891, to Feb. 1, 1892	1,230	1,629,413	19,247,795	
Feb. 1, 1892, " 1893	1,412	1,926,897	22,674,186	
" 1893, " 1894	1,718	4,348,902	27,875,355	

Total number of actual fires	1,464
Confined to one building	1,056
Extended to others	27
Wharves, vessels, grass, etc.	302
Out of the city	7

BUILDINGS.

Slightly damaged	691
Considerably damaged	78
Totally destroyed	26
Not damaged	344

[1] The losses and insurance of the great fire of the 9th of November, 1872, are not included in the above table. The amount of property destroyed can be set down at $75,000,000; the area, 65 acres; buildings destroyed, 776, of which 709 were brick and stone, and 67 wood.

TABLE NO. 1.

MONTHS.	ALARMS RECEIVED. FROM WHOM.							LOSS.		INSURANCE.		ALARMS. TELEGRAPH			STILL				BUILDINGS.					
	Fire patrol.	Members.	Police.	Citizens.	Automatic.	Unknown.	Total.	Buildings.	Contents.	Buildings.	Contents.	Fire.	False.	Needless.	Still.	Confined to Building.	Extended to others.	No fire.	No Damage.	Slight Damage.	Considerable D'ge.	Totally Destroyed.	Out of the City.	Wharf, Vessels, Coal-pile, Tree, Grass, Rubbish, etc.
February	.	7	13	77	4	4	105	$30,036	$186,531	$763,600	$158,500	59	4	13	29	73	1	8	18	49	8	1	1	6
March	1	5	9	102	2	2	121	1,219,827	2,102,278	2,935,377	3,977,597	56	1	18	46	89	3	7	27	75	9	11	. .	3
April	2	1	10	80	1	3	97	20,198	46,695	917,746	349,300	48	3	12	34	60	1	9	14	40	6	2	. .	12
May	1	5	24	84	3	. .	117	19,346	23,462	882,144	623,520	58	. .	15	44	77	4	9	27	49	8	2	1	11
June	5	3	20	75	6	3	112	10,355	18,114	976,020	1,135,370	42	2	16	52	60	. .	7	18	40	3	. .	. .	27
July	24	40	56	159	3	3	285	12,530	50,071	566,710	591,447	84	3	14	184	112	2	8	31	81	5	3	1	142
August	2	7	4	95	3	1	112	6,807	9,298	549,777	155,550	45	1	11	55	68	1	17	19	48	2	1	. .	12
September	8	13	12	104	2	2	141	10,764	22,343	979,983	231,825	45	1	15	82	70	2	17	25	43	5	1	1	32
October	3	8	14	102	2	8	137	26,965	37,912	745,818	1,497,025	51	6	19	61	92	4	. .	39	64	6	. .	1	14
November	7	10	17	114	4	4	156	19,241	47,056	1,010,700	1,068,530	65	5	23	63	109	3	2	65	57	6	2	. .	18
December	2	11	27	131	7	4	182	96,475	145,613	2,195,359	2,024,855	80	5	31	66	138	5	1	33	97	15	2	1	14
January	3	11	15	116	4	4	153	97,481	89,501	1,452,600	1,086,011	65	7	29	52	108	1	. .	28	48	5	1	1	11
Totals	58	121	221	1239	41	38	1718	$1,570,0	$2,778,877	$13,975,825	$13,899,530	696	38	216	768	1056	27	85	344	691	78	26	7	302

TABLE No. 2.

Exhibiting the Number of Alarms for the Days of the Week from February 1, 1893, to February 1, 1894.

MONTHS.	Sunday.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Totals.	REMARKS. Alarms not included.
February	10	14	12	18	19	17	15	105	4 second alarms not included.
March	20	13	15	27	23	16	7	121	1 second, 1 third, and 1 general alarms not included.
April	16	8	7	19	17	16	14	97	3 second alarms not included.
May	20	14	23	15	17	14	14	117	2 second and 1 third alarms not included.
June	10	16	15	17	12	20	22	112	1 second alarm not included.
July	18	56	127	28	13	16	27	285	2 second alarms not included.
August	16	9	21	23	26	9	8	112	
September	16	16	23	25	13	28	20	141	
October	27	22	26	17	14	19	12	137	4 second alarms not included.
November	23	18	20	20	27	27	21	156	1 second alarm not included.
December	25	14	23	28	36	26	30	182	4 second, 1 third, and 1 fourth alarms not included.
January	25	19	17	31	24	18	19	153	4 second, 1 third, and 1 fourth alarms not included.
Totals	226	219	329	268	241	226	209	1,718	26 second, 4 third, 2 fourth, and 1 general alarms not included.

Table No. 3.

Exhibiting the Number of Alarms for each Hour of the Day, from February 1, 1893, to February 1, 1894.

Months.	A.M.													P.M.													
	12 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	Total A.M.	12 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	Total P.M.	Grand Total.
February	3	3	3	2	5	3	2	2	5	2	7	4	41	4	6	2	5	8	6	8	9	3	7	2	4	64	105
March	6	1	2	6	1	0	3	3	7	5	8	5	47	8	5	1	4	4	6	9	11	9	3	7	7	74	121
April	3	2	1	4	1	1	3	2	3	2	3	10	35	4	3	1	6	5	3	8	4	7	10	9	2	62	97
May	2	2	3	7	1	2	2	3	8	6	7	8	51	3	3	2	5	5	3	4	12	12	6	5	6	66	117
June	5	5	2	3	0	0	6	3	3	4	7	4	42	4	8	5	5	7	4	3	5	4	14	9	2	70	112
July	17	9	13	19	3	3	2	4	5	10	12	8	105	12	9	10	7	8	9	4	9	20	37	31	24	180	285
August	2	2	3	1	2	2	1	1	4	4	5	4	31	10	6	3	4	8	6	9	7	14	7	4	3	81	112
September	5	3	3	4	2	1	4	2	10	3	11	4	52	9	4	2	4	8	8	14	8	13	13	4	2	89	141
October	5	3	1	1	2	1	3	5	0	8	6	2	37	9	6	11	6	6	9	10	13	11	10	4	5	100	137
November	3	2	1	1	1	3	1	3	7	6	9	8	45	9	6	8	10	9	18	6	9	16	9	5	6	111	156
December	8	4	5	5	2	5	9	4	5	10	6	4	67	8	3	7	7	12	17	16	7	16	12	6	4	115	182
January	3	6	1	3	6	5	3	0	4	6	12	5	54	7	6	8	3	11	11	15	10	12	7	4	5	99	153
Totals	62	42	38	56	26	26	39	32	61	66	93	66	607	87	65	60	66	91	100	106	104	137	135	90	70	1,111	1,718

Table No. 4.

Showing the Number of Alarms for the Different Sections of the City from February 1, 1893, to February 1, 1894.

Months.	District No. 1.					District No. 2.					District No. 3.					District No. 4.					District No. 5.					District No. 6.					District No. 7.					District No. 8.					District No. 9.					District No. 10.					Total Alarms.
	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	Bells.	Stills.	False.	Needless.	Total.	
February . . .	4	.	.	1	4	3	.	.	.	3	18	3	1	3	21	12	7	1	3	19	16	4	.	1	20	6	3	1	.	9	2	6	.	1	8	2	3	.	2	5	5	3	1	.	8	6	2	.	2	8	105
March	5	4	.	1	9	7	5	0	5	12	9	7	1	.	16	10	6	.	2	16	11	11	.	1	22	11	2	.	2	13	4	5	.	1	9	7	2	.	3	9	3	2	.	1	5	8	2	.	2	10	121
April	4	7	.	.	11	7	3	.	1	10	8	2	.	.	10	6	2	.	2	8	6	.	.	.	6	9	.	1	3	9	4	3	.	.	7	6	5	2	2	11	4	6	.	1	10	9	6	.	3	15	97
May	1	5	.	.	6	8	1	.	4	9	14	5	.	3	19	9	2	.	.	11	8	5	.	.	13	5	11	.	1	16	6	7	.	2	13	8	3	.	2	11	5	1	.	1	6	9	4	.	2	13	117
June	4	12	.	.	16	8	3	1	3	11	11	1	1	.	12	6	6	.	2	12	11	12	.	2	23	5	5	.	2	10	3	7	.	2	10	4	2	.	.	6	4	1	.	3	5	4	3	.	2	7	112
July	4	35	.	.	39	9	5	1	1	14	17	5	.	3	22	10	12	.	1	22	8	18	.	.	26	18	47	1	6	65	6	21	.	1	27	9	18	.	1	27	4	13	.	.	17	16	10	1	1	26	285
August	6	7		1	13	5	4	.	2	9	2	5	.	1	7	9	7	.	.	16	10	9	.	1	19	4	7	.	2	11	6	4	.	.	10	6	4	.	2	10	3	4	.	2	7	6	4	1	.	10	112
September . .	4	5	.	.	9	8	3	1	.	11	5	15	.	1	20	9	11	.	6	20	14	17	.	4	31	7	4	.	2	11	2	14	.	.	16	5	6	.	1	11	3	4	.	1	7	2	3	.	.	5	141
October	4	4	3	.	8	8	4	.	2	12	9	9	2	3	18	13	10	.	4	23	8	10	.	2	18	2	6	.	.	8	7	8	.	3	15	4	7	.	3	11	1	9	.	1	10	7	7	1	1	14	137
November . .	6	7		2	13	7	6	2	1	13	8	5	.	2	13	10	7	1	1	17	10	9	.	2	19	8	6	.	1	14	9	11	2	6	20	10	15	.	4	25	3	3	.	1	6	5	11	.	1	16	156
December . .	7	3	2	1	10	7	5		3	12	10	13	1	10	23	13	16	1	3	29	15	23	.	4	38	8	4	.	.	12	6	8	.	5	14	11	7	.	3	18	6	7	.	.	13	10	3	1	2	13	182
January . . .	3	7	1	1	10	8	5	1	5	13	6	2	.	1	8	13	12	.	4	25	11	17	4	5	28	7	11	.	5	18	10	9	.	4	19	8	5	1	1	13	3	4	.	2	7	9	3	.	1	12	153
Totals . . .	52	96	6	7	148	85	44	6	27	129	117	72	6	27	189	120	98	3	28	218	128	135	4	22	263	90	106	3	24	196	65	103	2	25	168	80	77	3	24	157	44	57	1	13	101	91	58	4	17	149	1,718

Table No. 5.

Showing the Different Causes of Fires and Alarms, from February 1, 1893, to February 1, 1894.

Alarms, accidental, automatic	13
" needless	216
" false	38
" out-of-town fire	5
Ashes, hot, in wooden receptacle	28
Boiling over of tar or fat	9
Bonfires — grass, rubbish, etc.	186
Building fire with kerosene	3
Chimneys, burning of soot in	51
Careless use of lamps, candles, etc.	26
" " fire	5
" pipe or cigars	30
" smoking	9
" clothes too near stove	7
Defective flue	24
" stove-pipe	3
" grate	3
" furnace	8
Electric motor igniting car	33
Electric wires	40
Explosion of chemicals	10
Fireworks	25
Friction of machinery	6
Gas, explosion of	10
" ignition of leaky pipe	8
" jet setting fire	39
Hot iron and coals igniting woodwork	11
Incendiary	32
" supposed	18
Ignition of spirit or chemicals	14
Light mistaken for fire	4
Kerosene lamp, breaking or explosion	101
" " upsetting of	33
" stove, careless use of and explosion	48
Matches and rats	32
" careless use of	62
" children playing with	58
Overheated stove	26
" furnace or oven	17
" steam-pipe or boiler	15
Slacking of lime	7
Spontaneous combustion	63

Sparks from another fire	1
" " furnace or stove	19
" " engine	4
" " locomotive	22
" " forge	8
" " chimney	22
Unknown	241
Upsetting stove	2
Water-pipes, thawing out of	16
Wood in oven igniting	4
Struck by lightning	6
Total	1,718

Respectfully submitted,

ROBERT G. FITCH,
JOHN R. MURPHY,
GEORGE H. INNIS,
Fire Commissioners.

APPENDIX.

The following tables show the location of the several pieces of apparatus in service or reserved, together with the name of the builder and when put in service; also a statement of the hydrants and reservoirs in use, the reports of Commissioner John R. Murphy on Foreign Fire-service, and the City Engineer on Tests of Engines, and the fires and alarms from February 1, 1893, to February 1, 1894:

STEAM FIRE-ENGINE COMPANIES.

No.	Location.	Built by.	Put in Service.	Cylinder.		Pump.		Amount of Water delivered at 300 revolutions per minute.	
				Diameter.	Stroke.	Diameter.	Stroke.		
1	Dorchester, near Fourth, S.B.	Amoskeag Mfg. Co.	Sept. 17, 1872	7⅝	8	4½	8	Double.	630 gallons.
2	Fourth st., cor. O, S.B.	Manchester Loco. Works	Nov., 1890	6⅛	8	4	8	Double.	496 gallons.
3	Harrison ave., cor Bristol	Clapp & Jones	Aug. 22, 1890	9	8	5½	8	Double.	961 gallons.
4	Bulfinch st.	Clapp & Jones	Feb. 22, 1893	9	8	5½	8	Double.	961 gallons.
5	Marion st., E.B.	Amoskeag Mfg. Co.	Nov., 1869	7⅜	8	4⅜	8	Double.	593 gallons.
6	Leverett st.	Silsby Mfg. Co.	April 11, 1890	Rotary				Rotary.	700 gallons.
7	East st.	Clapp & Jones	April 10, 1890	8	7	5	7	Double.	691 gallons.
8	Salem st.	Freeman & Jucket	April 26, 1869	7¼	8	4½	8	Double.	630 gallons.
9	Paris st., E.B.	Hunneman & Co.	Oct. 14, 1872	7¼	8	4½	8	Double.	630 gallons.
10	Cor. Vernon and River sts.	Amoskeag Mfg. Co.	Feb. 1, 1870	7⅜	8	4⅜	8	Double.	593 gallons.
11	Cor. Saratoga and Byron sts., E.B.	Amoskeag Mfg. Co.	April 9, 1873	6⅞	8	4¼	8	Double.	561 gallons.
12	Dudley st.	Manchester Loco. Works	March 27, 1882	6⅞	8	4¼	8	Double.	561 gallons.
13	Cabot st.	Freeman & Jucket	April 10, 1870	7¼	8	4⅜	8	Double.	593 gallons.
14	Centre st.	Amoskeag Mfg. Co.	Sept. 17, 1870	7⅜	8	4⅜	8	Double.	593 gallons.
15	Dorchester ave. and Broadway	Clapp & Jones	Feb., 1893	9	8	5½	8	Double.	961 gallons.
16	Temple st., Dorchester	Silsby Mfg. Co.	April 8, 1890	Rotary				Rotary.	700 gallons.
17	Meeting-House Hill	Amoskeag Mfg. Co.	Sept. 1, 1870	7⅝	8	4⅜	8	Double.	593 gallons.
18	Harvard st., Dorchester	Manchester Loco. Works	Nov., 1890	6⅛	8	4	8	Double.	496 gallons.
19	Norfolk st., Dorchester	Clapp & Jones	Dec. 5, 1891	7	7	4⅜	7	Double.	524 gallons.
20	Walnut st., Dorchester	Manchester Loco. Works	Nov., 1890	6⅛	8	4	8	Double.	496 gallons.
21	Boston st., Dorchester	Clapp & Jones	Dec. 10, 1893	7	7	4⅜	7	Double.	524 gallons.
22	Dartmouth st.	Silsby Mfg. Co.	Aug. 7, 1882	Rotary				Rotary.	700 gallons.
23	Northampton st.	Silsby Mfg. Co.	Sept. 12, 1890	Rotary				Rotary.	700 gallons.
24	Warren, cor. Quincy st.	Clapp & Jones	Feb. 24, 1888	7	7	4⅜	7	Double.	524 gallons.
25	Fort Hill sq.	Clapp & Jones	Nov., 1890	9	8	5½	8	Double.	961 gallons.

26	Mason st.	Clapp & Jones	April 1, 1890	8	7	5	7	Double.	691 gallons.
27	Elm st., Charlestown	Amoskeag Mfg. Co.	July 1, 1872	7⅞	8	4½	8	Double.	630 gallons.
28	Centre st., W. Roxbury	Silsby Mfg. Co.	April 28, 1886	Rotary		.....	....	Rotary.	700 gallons.
29	Chestnut Hill Ave., Brighton	Hunneman & Co.	Jan. 1, 1874	7¼	8	4⅜	8	Double.	599 gallons.
30	Mt. Vernon st., W. Roxbury	Clapp & Jones	Oct. 9, 1891	7	7	4⅜	7	Double.	524 gallons.
31	South side India wharf { Fire-boat. }	Clapp & Jones	July 3, 1889	16	10	9	10	2 sets of pumps.	6,414 gallons.
32	Bunker Hill st., Charlestown	Manchester Loco. Works.	Mar. 28, 1884	6⅞	8	4¼	8	Double.	561 gallons.
33	Boylston st.	Silsby Mfg. Co.	Feb. 20, 1888	Rotary		.....	....	Rotary.	700 gallons.
34	Western ave.	Hunneman & Co.	Jan. 12, 1871	7¼	8	4½	8	Double.	581 gallons.
35	Mason st.	Clapp & Jones	Aug. 9, 1890	9	8	5½	8	Double.	961 gallons.
36	Monument st., Charlestown	Manchester Loco. Works.	Dec., 1890	6⅛	8	4	8	Double.	496 gallons.
37	Longwood ave.	Amoskeag Mfg. Co.	July 1, 1867	7⅞	8	4⅜	8	Double.	593 gallons.
38	Congress st.	Clapp & Jones	Nov., 1890	9	8	5½	8	Double.	961 gallons.
39	Congress st.	Amoskeag Mfg. Co.	Dec. 15, 1879	6⅞	8	5¼	8	Double.	561 gallons.
40	Sumner st., E. B.	Silsby Mfg. Co.	May 18, 1891	Rotary		.....	....	Rotary.	700 gallons.
41	Harvard ave., Brighton	Clapp & Jones	Feb., 1893	7	7	4⅜	7	Double.	524 gallons.
42	Egleston sq., W. R.	Silsby Mfg. Co.	Feb., 1893	Rotary		.....	...	Rotary.	550 gallons.
43	Andrew sq., S. B.	Clapp & Jones	Mar. 3, 1893	7	7	4⅜	7	Double.	524 gallons.

In Reserve.

A	Manchester Loco. Works.	May, 1886	6⅞	8	4¼	8	Double.	561 gallons.
Relief C	Hunneman & Co.	Oct., 1873	7¼	8	4½	8	Double.	630 gallons.
" E. Old No. 4	Amoskeag Mfg. Co.	Nov., 1867	7⅞	8	4½	8	Double.	630 gallons.
" F. " Mystic	Amoskeag Mfg. Co.	Sept., 1865	8	12	4¼	12	Double.	829 gallons.
" G.	Silsby Mfg. Co.	Sept., 1880	Rotary		.....	....	Rotary.	900 gallons.
Old No. 17	Hunneman & Co.	March, 1867	7¼	8	4⅜	8	Double.	593 gallons.
D. Old No. 25	Silsby Mfg. Co.	July, 1884	Rotary		.....	...	Rotary.	700 gallons.
B. " " 21	Manchester Loco. Works.	March 1, 1882	6⅞	8	4¼	8	Double.	561 gallons.
H.	Amoskeag Mfg. Co.	Dec. 1, 1869	7⅞	8	4½	8	Double.	630 gallons.

Old engine out of service, No. 30.

CHEMICAL-ENGINE COMPANIES.

Number.	Location.	Builders.	Put in Service.	Weight as drawn to Fires.	Capacity, Gall.
1	Bulfinch street	Babcock Manufacturing Co.	Oct. 4, 1890.	5,680 lbs.	100
2	Church street	" " "	April 25, 1874.	5,500 "	160
3	Longwood avenue	" " "	July 27, 1874.	3,720 "	100
Comb. Wagon, 1	Washington street, Roslindale	" " "	Mar. 10, 1892.	3,705 "	100
5	Egleston square	C. H. Holloway.	Sept. 21, 1876.	5,134 "	170
6	So. Harvard ave., Brighton	Babcock	May 1, 1876.	5,030 "	160
7	Chelsea street, E. B.	Altered by Hinman	Sept. 27, 1886.	3,000 "	100
8	B street, S. B.	" " "	Oct. 27, 1887.	5,130 "	160
9	Main street, Charlestown	Rebuilt by Hinman	July 17, 1889.	2,990 "	100
10	Eustice street, Roxbury	" " "	Sept. 13, 1889.	2,990 "	100
Comb. Wagon, 2.	Fourth, between K and L sts,, S. B..	C. H. Holloway	May 12, 1893.	3,705 "	100

In Reserve.

11	Repair-shop	Rebuilt by Hinman	July 17, 1889.	2,900 lbs.	100
One new	"	Babcock Manufacturing Co.	Oct. 4, 1890.		100
" "	Combination Wagon.	" " "			

HORSE-HOSE COMPANIES.

Number.	Location.	Built by	Put in Service.	Weight as drawn to Fires.
				Lbs.
3	Winthrop street, Charlestown	Amoskeag Manufacturing Co.	Sept. 13, 1888.	2,830
5	Shawmut avenue	L. B. Button, N.Y.	Sept. 17, 1870.	2,850
7	Tremont street	Amoskeag Manufacturing Co.	July 4, 1868.	2,830
8	No. Grove street	" " "	July 4, 1868.	3,175

In Reserve — Hose-Carriage Relief, A, B, D, E, F, G.
" Old wagons of Engine 9-15, and Hose 4.

HOOK-AND-LADDER COMPANIES.

Number.	Location.	Builders.	Put in Service.	Weight as drawn to Fires.	Number of Ladders.
				Lbs.	
1	Warren square	Abbott-Downing Co.	December 20, 1890.	8,800	12
2	Paris street, E. B.	" " "	April 20, 1891.	9,805	12
3	Harrison ave., cor. Bristol st.	" " "	June 2, 1886.	9,535	22
4	Dudley street, Highland District	La France Fire-Engine Co., Elmira, N.Y.	April 25, 1884.	8,365	Hayes Extension.
5	Fourth street, near Dorchester	Hunneman & Co.	March 3, 1870.	6,050	17
6	Temple street, Dorchester	" "	August 18, 1873.	6,043	19
7	Meeting-House Hill	Juckett & Freeman	January, 1869.	6,560	14
8	Fort Hill square	Abbott & Downing	January 30, 1890.	9,535	14
9	Main street, Charlestown	Leverich & Co., N.Y.	October 6, 1872.	5,820	19
10	Centre street, Jamaica Plain	Hunneman & Co.	December 21, 1870.	5,400	12
11	Chestnut Hill avenue, Brighton	" "	January, 1874.	4,350	13
12	Tremont street, Highland District,	Ryan Bros.	July 31, 1880.	6,850	15
13	Washington street, near Dover	La France Fire-Engine Co., Elmira. N.Y.	March 12, 1890.	6,800	Hayes Extension.
14	Fort Hill square	Fire Extinguisher Manufacturing Co., Chicago	January 30, 1893.	10,000	Extension.
15	Boylston street	Fire Extinguisher Manufacturing Co., Chicago	April 28, 1888.	10,600	Extension.
16	Roslindale	Repair-shop	September, 1888.	5,400	15 Extension.
17	Harrison avenue	Preston Co., Chicago	April 29, 1891.	11,975	87 feet.

HOOK-AND-LADDER TRUCKS. — In Reserve.

	Description.	Builders.	Put in Service.	Weight as drawn to Fires.
	Relief C, formerly old No. 2.			
	Relief A, old 3	Hunneman & Co.	April 25, 1885.	*Lbs.* 8,375
	" B, old 8	Repair-shop.		
	Aerial Ladder	Aerial Ladder Co.	March 28, 1876.	6,000
	One new	Abbott-Downing Co.	1890.	9,535
	Old Ladder 4	Hunneman & Co.	April 13, 1872.	8,065

FUEL-WAGONS.

Location.	Builder.	Put in Service.	Number of Coal Boxes.	Weight of Wagon.	Weight of Coal.
Engine-house No. 11, Sumner street, E. Boston	. . . . .	. . . . .	8	1,260 lbs.	990 lbs.
Coal Depot, Main street, Charlestown	Abbott & Downing	1865.	8	1,200 "	1,600 "
Coal Depot, Main street, Charlestown	Abbott & Downing	. . . . .	10	1,760 "	1,800 "
Engine-house No. 3	. . . . .	. . . . .	10	1,620 "	2,000 "
Engine-house No. 29, Chestnut Hill avenue	J. T. Ryan	1870.	10	1,467 "	1 800 "
Hose-house No. 8, North Grove street	J. T. Ryan	1872.	8	1,675 "	1,280 "
Hook & Ladder No. 5, Fourth, near Dorchester street	J. T. Ryan	1873.	8	1,800 "	3,100 "
Engine-house No. 10, Mt. Vernon street	. . . . .	1878.	8	1,200 "	800 "
Engine house No. 18, Harvard street, Dorchester District	J. T. Ryan	1871.	. . . . .	1,780 "	2,000 "
Engine-house No. 21, Boston street, Dorchester District	J. T. Ryan	1872.	8	1,272 "	1,400 "
Engine-house No. 16, Temple street, Dorchester District	J. T. Ryan	1870.	8	1,146 "	1,200 "
Engine-house No. 28, Centre street, West Roxbury District	A. Dixon	1873.	6	1,120 "	1,200 "
Engine-house No. 13, Cabot street	J. T. Ryan	1870.	. . . . .	1,745 "	1,500 "
Hose-house No. 8, North Grove street	. . . . .	Jan. 3, 1878.	10	1,760 "	2,000 "
Hose-house No. 12, E. Fourth street, So. Boston	Abbott-Downing Co.	1883.			
Engine-house No. 24, Warren street	J. T. Ryan	April 13, 1883.	8	1,750 "	1,600 "
Engine-house No. 19, Norfolk street, Dorchester	. . . . .	. . . . .	4	720 "	500 "
Engine-house No. 20, Walnut street, Dorchester	. . . . .	. . . . .	. . . . .	700 "	500 "
Engine-house No. 17, Meeting-House Hill	J. T. Ryan	1884.			
Engine-house No 23, Northampton street	. . . . .	May 1, 1886.	. . . . .	1,400 "	1,500 "
Engine-house No. 26, Mason street	J. T. Ryan	. . . . .	8	1,690 "	1,280 "
Coal Depot, Shaving street.					
Engine-house No. 30, West Roxbury	Fire Department Shop	Feb. 16, 1887.	6	1,400 "	1,000 "
Engine-house No. 33	Abbott-Downing Co.	Feb. 20, 1888.	. . . . .	1,675 "	1,280 "
Engine-house No. 12, Dudley street	Abbott-Downing Co.	Feb. 26, 1889.	8	720 "	500 "
Engine-house No. 34, Western avenue, Brighton	Abbott-Downing Co.	Nov. 1, 1888.	8	720 "	500 "
Engine-house No. 36	Abbott-Downing Co.	Sept. 24, 1890.	8		
Engine-house No. 37	. . . . .	Sept. 15, 1890.			
Engine-house No. 14	. . . . .	Sept. 20, 1890.			
Engine-house No. 38	Abbott-Downing Co.	May 15, 1891.	10	1,800 "	
Engine-house No. 40, E. Boston	. . . . .	July 29, 1891.	10	1,800 "	
Engine-house No. 22, Dartmouth street	Abbott-Downing Co.	July 12, 1891.	8	720 "	
Engine-house No. 41	. . . . .	. . . . .	10	1,800 "	
Engine-house No. 42.					
Engine-house No. 43	Chas. Waugh	March 3, 1893.	10	1,800 "	

One new wagon, large.
One new wagon, small.

SALT-PUNGS.

District.	Location.	No.	Miscellaneous.
1	Engine-house 9	1	
2	Engine-houses 27, 36	2	District Chief's Pungs, 8.
3	Engine-house 8	1	Spare Pung, 1.
4	Engine-house 8	1	Caravan, 1.
5	Engine-house 26	1	
6	Engine-house 1	1	Wagons (Dist. Chief's), 11.
7	Engine-house 3	1	Wagons, Spare, 4.
7	Engine-house 22	1	
8	Engine-house 29	1	
8	Engine-house 13	1	Supply Wagons, 3.
8	Engine-house 14	1	
9	Ladder-house 4	1	
9	Engine-house 17	1	
9	Engine-house 12	1	
10	Engine-house 28	1	
10	Engine-house 18	1	
Spare	At Shop	4	
	Fire-Alarm Dept.	3	
	Engine-house 41	1	
	Engine-house 42	1	

REPORT OF COMMISSIONER JOHN R. MURPHY ON FOREIGN FIRE-SERVICE.

JULY 30, 1893.

To the Board of Fire Commissioners:

GENTLEMEN: In accordance with a vote passed by you, I submit the following report in reference to the fire departments and fire methods of the cities of London and Paris:

I spent two weeks inspecting London's fire department, most of the time, with the exception of one day, unofficially.

London has a population of about 4,250,000, and an area of 120 square miles. The Thames river, flowing through the city, although subject to considerable tide, makes a very valuable aid in case of fire. The streets are broad in the newer parts of the city. In the old city they are narrow. The buildings are so low and small in area that they do not present great difficulties in case of fire.

The water-service is supplied by some eight private companies which, by act of Parliament, furnish water for fire purposes.

The government of the city is complex. The old city of London, which comprises about a mile of territory, has a government of its own, with authority fixed by Parliament. The County Council, so called, governs the whole city (120 square miles) on certain questions of a metropolitan nature, under a special act of Parliament. In addition they have governing boards, which they call vestries, some forty in number, that look after the local affairs of sections which would correspond to wards in an American city. Questions such as streets, lights, local sewers, and such matters come under their care. The fire department being a general rather than a local question, comes under the London County Council, and is governed by that body through a committee in the same way as the American fire departments were managed twenty years ago.

The department consists of over 800 men, about 50 land steam fire-engines, 9 steam fire-engines on barges, used in river service, 9 large ladders, quite a number of hand-engines and hose-carts, most of which are in the same stations as the steam fire-engines, and 179 single ladders at fire-escape stations. The above includes men and apparatus in active service. These facts I obtained from one of the principal officers of the department, except that he said there were 155 fire-escape stations, while their annual report calls for 179.

The ladder service consists of the 179 ladders which are at the fire-escape stations, some 7 fire ladders, each of which has one end on two wheels and the other end tied on ordinary four-wheeled carts, and 2 extension American ladders. Some, if not all, of these ladders are placed in sheds in the rear of the stations, and are not equipped for immediate service. The houses in which the men and apparatus are quartered are in excellent condition, and compare more than favorably with the houses of an American department. Glazed brick, which costs with us from $120 to $130 per thousand, is used on the interior, and most of the houses that I personally inspected could be justly entitled luxurious in their appointments and appearance. The cost of their new fire stations alone averages about $40,000. As the price of building is low in London, that would be equal to from $60,000 to $80,000 with us.

The number of men attached to a company is 12. The fire-escape stations are covered by details from the nearest company. Most, if not all, of these fire-escape stations have each a detail at night of from one to three men. In the daytime the greater part of them have no firemen present, and the ladder is wheeled to one side in the nearest convenient place where it can be stored, generally the yard of some public building. The ladders are mounted on two wheels and stand upright from them. They appear to be about forty feet in length when extended, and are wheeled to the fire by hand. The public are supposed to assist if needed, and an allowance of 1s. is made to each of two citizens aiding, and of 1s. 6d. to a third citizen, provided he also gave the alarm. Most of these fire-escape stations have no connection with headquarters either by telephone or telegraph. In order to reach them a special messenger has to be sent.

In each engine-house they receive alarms from what they call 8 to 11 "points," or what we would call fire-boxes. The boxes are small, with a glass front. In most cases they are without any sign or any way of alarming the public, to prevent a false alarm being sent in. You break the glass, and a knob with "pull" on it is there for you to give the alarm. Pulling the knob drops a disk similar to an annunciator in the nearest engine-house.

The *modus operandi* at the station is as follows: Officer in charge is notified of an alarm by man on patrol, and he rings for the men. If at night, they are sleeping (in the houses that I examined) on the third and fourth stories, a hundred feet or more in the rear. They jump out of bed, pull on their trousers, and in their stocking feet run down long corridors, come down the long flights of stairs to the

floor (in some cases going to separate buildings for the horses from that where the engine is stationed), take off the halters, take down the harnesses, put them on, place the bits in the horses' mouths, run out holding them by the heads and hitch them up.

The water in the boiler of the engine is kept warm by gas conveyed to the fire-box by rubber hose. They unhitch the hose from the door of the fire-box, put in the shavings and wood, take a match and light it. The men go to racks upon the walls where their clothing is hanging, take their leather boots and pull them on, then put on their coats, buckle their belts, containing a small hatchet and other implements, round their bodies, place their helmets on their heads, and then take their positions on the apparatus. The engine is a hose-wagon and engine combined, so that when the engine comes to a fire it is in the form of one piece of apparatus. The time of hitching up in the house at night, I was informed, was from three to four minutes. I saw in the headquarters of the service a hitch-up made, with the men on the floor dressed, boots, helmets, all complete, with a hand-engine, where they had no trouble in the way of firing the boiler and harnessing the horses. This was practically what Americans would call a floor hitch, and the time was over 35 seconds. A floor hitch in an American house can be made under far less favorable circumstances in from 2 to 6 seconds; a night hitch, with the men in bed, in less than 20 seconds.

English methods of getting apparatus to work at a fire are so slow that one does not ask how many minutes it takes before a company is at work, but what portion of an hour. American departments can best understand their slowness when they call to mind the fact that in every American city that claims to have a first-class department, an alarm from its dangerous boxes means that a company will arrive there with its engine in working order, and get its men inside the building, playing water on the fire, in less time than a London engine takes to hitch up. After the apparatus leaves the house it goes with considerable speed to the fire. Before leaving the house, however, the officer telephones the superintendent of the district, corresponding to the district chief with us, where he is going, and the superintendent telephones to have a second engine from his district follow the first. When the engines arrive at the fire, if more are wanted, a man is sent on horseback to the nearest fire station, which may be a mile away, and he telephones to the district superintendent how many more engines are wanted, and more engines are sent from time to time, as called for

by telephone, each time the man going back on horseback to convey the order of his superior officer. If the fire is of such magnitude as to exhaust the engines of one district, then headquarters, when telephoned, sends more from the next district, and so on until the engines of the whole city are at the fire.

Some of the engines have the doors of the fire-boxes in the front part of the boiler, so that the engineman cannot reach them when responding to an alarm. Fully one-half, I should judge, of the entire London service is this way. The result is that, after they leave the house, it is impossible to feed the fire and get up steam on the way, and the engine, if going any distance, would, under these circumstances, arrive frequently at the fire without being in a condition to get to work immediately.

The hand-engines are sent to alarms of fire from the nearest boxes to the engine station. To boxes at a distance, or when it is known that there is a fire in progress, steam-engines are sent.

When the engine arrives at a fire it is attached to a hydrant in the following way: a pipe about two inches in diameter is screwed on to the hydrant, a piece of hose is screwed on to that and run into what they call a fire-dam or canvas box, which has to be set up. The water is let into the canvas box, and from this the engine runs its suction and draws its supply of water. At the fires I attended, one hydrant and one canvas box supplied one engine. In the meantime some of the men take the hose, which is in separate lengths and rolled up like a coil of ribbon. One man couples a length to the engine and runs with the end, then another man runs with a coil and couples it on to that and runs with it toward the fire, then the first comes with another coil and couples it on. This peculiar way of running a line is kept up until the requisite length of hose to reach the fire is obtained. The pipe is then screwed on, and, if the engine has sufficient steam, the company is ready for action.

The hose couplings are two inches, the streams played from hydrants a half-inch, and the streams played by engines on land three-quarter inch. I was informed that they also used inch streams, but I did not see any nozzles of that size on the engines, neither did I see any in use at any of the fires I attended. Before an engine can get its supply of water it very often has to be turned on by an employee of the water service. If he is not there, he is either sent for or the firemen have appliances with which to turn it on.

The smallness of the engines especially struck me. All their engines are single pump with small boilers, and a very few of them, about six, deliver a gallon and a half per

stroke. The balance is divided between engines that deliver about a gallon and a gallon and a quarter. They are tested when purchased on the basis of 150 revolutions per minute, and their maximum and minimum according to the condition and age of the steamer is 120 and 90 revolutions. On the basis of 120 revolutions the maximum capacity of their engines is 120, 150, and 180 gallons per minute respectively.

If ladders are needed at a fire they have to depend upon the small ladder carried by the steamer, which would not reach some of our second stories, or the ladder which comes from the fire-patrol station if the alarm was given from there. If more are needed they have to send to the nearest station a special messenger and have them come by hand. If the longer ladders are wanted they are brought by horses.

In one of the engine stations I saw the method of conveying one of their long ladders. One end of the ladder is on two wheels, the other end is tied on a four-wheeled team which they call a van. If needed at a fire it is called by telephone, and the engine-horses are hitched to the van and they draw it there. I said to the man on duty, "If your horses draw this ladder to a fire, and the engine is wanted, what do you do?" He said, "We can't take it; we would have to fall back on a hand-hose cart." In other words, the ladders are brought to fires by hand, except the nine large ones, which are brought by horses when specially sent for by messenger.

What they call a large ladder is about equal to one of our Bangor ladders, which we carry on our ladder trucks. Their way of carrying large ladders, while not quite so difficult as the carrying of ship-masts through the streets, is almost as cumbersome. It is impossible to convey the London ladders with that celerity which is essential in case of fire.

The men of the London brigade are recruited from sailors. Twenty or thirty years ago, before the ocean steamship developed to such an extent, there might have been more grounds for this than there are to-day. Sailors on steamships are not sailors of the generations that have passed, and while it may be good judgment to have a proportion of the service sailors, it is not, in my opinion, good policy to have it so exclusively. The fireman in a modern city should not only have ability to climb, to handle ropes, as the old-time sailor, but should combine with that a mechanical ability which would make him familiar with buildings and their construction, and, as a climax, he should be possessed of the requisite daring and judgment to make of him what may be justly called a modern fireman. The men of the

London service struck me as being strong, rugged, and possessed of most of the requisites which make a fireman, but, by training, they have no knowledge of building construction. This is an essential weakness. The physical and mental examinations which they go through are not so stringent as in Boston; neither is their drill-school so well developed in its methods.

The pay is 24s. ($5.76) a week when they first enter, with slight increases for the first few years. After that, in order to reach the maximum of pay, 37s. 6d. ($9) a week, they have to await vacancies and take the raise of pay in the order of seniority. It takes about fourteen years to reach the highest grade, and a fireman must serve twenty-eight years before he is entitled to a pension. Out of his salary the fireman pays a small sum for his quarters in the engine-house.

A curious fact connected with the service is the large number of changes that take place yearly. In the last year 96 men out of a total of 825 left the service, and of this number 53 resigned. There is but one deduction from this extraordinary state of affairs, and it is that it comes either because of the peculiar roving disposition of the sailors that compose the service, or the small pay and the long service necessary in order to obtain the high pay. A service which changes like this cannot get the best results. It must be lacking in well-trained and experienced men.

The engines of the service are too small in their capacity. While they meet the ordinary demands, when an extraordinary demand comes they are not sufficiently large in water-throwing capacity. It is pretty much the same as though an army had all light guns and none of heavy calibre. The reason given for the use of such engines is a desire to get quickly to a fire. Yet in their hitching and going to a fire they lose many minutes. In their methods after getting to a fire there is so much time wasted that it strikes an American very unfavorably.

This extreme smallness of engines is all the more remarkable when I saw engines of English make, of double the capacity, and even more, of the London engine, on exhibition by makers and in service in other English cities, the weight of which was not much greater than that of the London brigade engines. London should send most of the engines that she has now to the outskirts, and in the five or six congested centres of that great city use engines of large water-throwing capacity and light in weight.

The horses of the service are splendid animals. This is to be expected in a horse country like England. They are hired, not owned, by the service.

The water service seemed to me to be sadly lacking in many respects. It should be owned by the people for the public benefit, not by private corporations for private gain. The system, to say the least, is peculiar. In many parts of London they have what they call "intermittent supplies;" that is, the water is let on at a certain hour in the morning. For domestic purposes people fill the tanks in their houses, and then the water is shut off. The same rule of shutting off, except when needed, applies to water for fire service, and cases have occurred where engines have responded to fires and have been unable to get water, owing to the fact that the man to turn on the water was not present. A system of this kind means, even if the water is turned on either by a representative of the water department or a fireman, delays of a dangerous nature. The hydrants are used also by men who are not connected with the water department. The use of them should be restricted under the supervision of the fire service and the water companies. The smallness of the hydrants, which furnish only about a two-inch water supply, struck me unfavorably. The number of hydrants, when we consider the area of the city and its population and the fact that one engine alone can connect to a hydrant, is extraordinarily small, and the result is that the engines cannot be massed sufficiently close to a fire to render full and efficient service. Their hydrants should be more numerous, and, like ours, post hydrants or their equivalent, so that four engines could be supplied from a hydrant instead of one. The canvas box should be done away with, and the engine suction connected direct to hydrant.

The hose is without jacket and lined with white rubber, which rubber dealers tell us is the weakest kind. The couplings are fastened by an old process long obsolete in America. Instead of using 2-inch couplings they should use at least 2½-inch, if not larger, and increase the size of their hose. Their method of running off a line of hose at a fire by coupling each piece after they arrive there, is behind the times. They should have their line all ready to pull off at a moment's notice, and all coupled, just as it is in an American service. Their system of combining hose and engine in one piece of apparatus could be, perhaps, economically used in the suburban parts of an American city, but in the heart of their city, as well as in Boston, the correct system is the engine and hose to be carried on separate pieces of apparatus. The size of their streams is too small for large fires. Their hand-engines are relics of barbarism. They do not use chemical engines as in America, yet they need them far more than we do.

Their fire-alarm boxes should all have signs telling how to work them, and when the glass is broken a bell should ring, as on our keyless doors. I think that would prevent many false alarms. Out of about 4,164 alarms of fire in one year, 1,029 were false — an extraordinary record, which can only be accounted for in part by the fact that in giving an alarm there is no way of notifying the police or public when a citizen is sending it in.

Their system of sending apparatus to the fire is slow and complex. It is impossible for them to mass their service quickly in case of great need, either wholly or in part. The American system, which makes it possible to notify the whole service within a few minutes, if necessary, is as superior to theirs as day is to night.

Their fire-escape stations with the men on duty at night should be covered in the day also, and so situated that all could be communicated with at once and notified other than by messenger if they are wanted. Either this should be done or the peculiar system as it now exists, which fritters away the strength of the department on unconnected bodies of men, should be abolished. If this is army discipline, it is a violation of the rules of warfare, which never allow, where it is possible to prevent, any portion of the army to have its communication cut off from the main body, its base of supplies.

Fires sometimes are large and travel fast in London, and the occasion has arisen, and will arise again, when the services of all her men will be needed quickly; yet it is impossible, under the present system, to obtain the whole service at once if wanted.

The average number of boxes per square mile in London is about four, so that, in order to give an alarm, it is necessary, in many cases, to run a long distance. Boston, with one-ninth the population, and a little over one-fourth the area, has as many fire-alarm boxes in service as has London. The boxes should be thicker in London, owing to the density of its population, and people should not be compelled to run so far in order to send in an alarm, and thus lose valuable time.

I investigated the question of patrolling the streets, and I found that the London brigade do no such thing. Statements have been publicly made in Boston that in London every fireman would be required to be familiar with every building in his district. This is not the fact. The firemen know nothing about the buildings; neither do their officers. In this respect the London service could take pattern from an American department, where, in accordance with rules which

they reduce to practice, the officers do understand, as far as in a human being lies, the construction of the buildings in their city. It is only fair, however, to say of the London service that their building construction is, in the main, of such a nature that the enforcement of a rule of that kind is not so necessary as it is in Boston.

The ladder service of the London brigade is not abreast of their steamer service. It is true that their fires, owing to good construction, in many cases do not travel fast. This gives many chances to put them out by inside fighting. Yet they have plenty of fires where it is necessary to get at the fire by ladders from the outside, and as their fire ladders are not run by horses, valuable time is frequently lost in scientifically attacking the fire. In conversation with fire authorities in London, I was informed that they could accomplish all they desired from the ground. A statement of this kind shows the utter lack of knowledge of ladder service possessed by foreign fire departments. London needs a first-class ladder service. Because of the lowness of its buildings there is not so much necessity for the heavy service of an American city; yet one modelled on the American principle, which embraces separate companies with ladders and apparatus for ladder duty only, and with the men and apparatus drawn by horses to fires, would increase to a wonderful extent the efficiency of the London brigade.

One hears a great deal more about saving life than about the amount of property lost in foreign fire services. A life saved receives more attention in the columns of the press than a fire that involves large loss. It is a feeling that is to be admired. I gave special attention to this branch of the service. I found in London 179 ladder fire-escape stations to 120 square miles of territory, or over one ladder to the square mile. In case a ladder was needed, that would make it necessary at times to run a mile or over to notify the fire-escape station, and then to have the ladder run back by hand all that distance. This is a vital error. The ladders should be situated so as to be called electrically, and thus save an enormous waste of time. Many of the ladders are equipped with a chute, down which the people to be saved are supposed to be sent. I question the usefulness of these chutes. It requires more men to handle them quickly than are attached to the ladders. I noticed that some of the latest ladders placed in service were without these chutes, and, on inquiry, was informed that none of the new ladders were equipped with them. Possibly the service of chutes is being done away with. If they are, it is good judgment.

For jumping-nets they have some made of canvas, such

as the American fire departments have discarded. The pompier ladder service and the use of ropes in connection with life-belts, for saving life, as practised in our Boston service, is unknown, although very essential in case of emergency. I saw no guns for shooting life-lines; neither are the men drilled after the American life-saving system. I have no hesitation in saying that the American ladder service, both for fire and for life-saving, is immeasurably superior to the system in vogue in London.

I was present at some fires in London and saw the department at work. The crowds congregate around the engines close to the fire more so than in an American city. I watched the methods of the department and failed to see, either in discipline or so-called scientific fire-fighting, where they equal the fire department of a large American city.

Siamesing is not practised to any extent. They have some simple two-way siamese, but I did not see them in actual work. They try to reach the inside of a building at a fire, the same as our firemen. They also attack from the street at various points; but, unlike our firemen, they are not able, by means of an excellent ladder service, water-towers, engines with large streams and three-way and four-way siamese, to direct their streams of water so as to go straight in in heavy volumes through the windows and openings, and strike at the heart of the fire. Streams directed from the street must necessarily lose much of their efficiency when they enter in a slanting direction.

It would appear that the London department does not bother itself very much about science, for I was informed that they had lately tried hose unlined, which, for actual fire duty, is little better than no hose at all. All the fire departments from other cities outside of London that I met, without an exception, use hose unlined, which shows that scientific fire-fighting does not enter largely into the English fire departments.

Regarding the discipline of the London service, there is nothing to make it superior in this respect to an American service. It may compare favorably, and no more. As in any large body of men, whether a fire service or an army, black sheep can be found, and men will take their chances of being caught in violation of the rules. A soldier on guard in the face of an enemy will desert his post for a short time, even when he knows the penalty is death. London has her share of delinquents.

I saw many things which, accustomed to the strictness of an American service, surprised me in London. I suppose they are allowable according to their rules. In some of the

houses I saw the captain standing at the door on the main floor of the house, partly in uniform, smoking a pipe, with the men in groups lounging around doing the same. Sometimes little children of two or three years of age would be seen playing around the engine. A happy family picture, yet hardly in accordance with strict discipline. I spoke to one of the members of the service in regard to this particular fact, and he seemed to take it as a matter of course. His reply was, "Why shouldn't we do it? The engine-house is our home." I believe that, in the matter of discipline, more is demanded and received in an American department than in an English service.

The system of utilizing the Thames river for fire-fighting purposes is by having engines on barges, and towing the barges with steam-tugs. It is not so good as the American system of having steamer and tug combined in what we call a fireboat. Such good results are not obtainable either in quick manœuvring or general efficiency at a fire.

London needs sliding-poles for its engine-houses, hanging harnesses, horses educated to run out at an alarm, an electrical system of sending in alarms which notify the whole service, two ways of sending them out, as in America, so that if one misses the second will not; an increased number of men in her companies, as, owing to details, a company frequently goes to a fire with only a few men. In short, she should adopt American fire-department methods more fully than she has.

From England we can learn much in the way of prevention of fires. In London, Liverpool, and in other large English cities which I visited, I saw no poles or electric wires of any kind in the streets. Everything was underground, and this is a remarkable evidence of the commonsense of the people, when we consider that in London alone over 40 different local governments have charge of the streets in matters of this kind. Their reasons for not allowing wires or poles on the streets are: First, danger from fire; next, because it spoiled the beauty of the streets. Quite a number of wires are run over the house-tops, not as with us on heavy, wooden, inflammable structures, but on small iron posts with cross-arms of the same metal, some of them carrying more than a hundred wires. The wires underground are in many cases laid in shallow iron trenches, placed under the sidewalk about a foot below the surface, and the results from having the wires underground have been successful in the extreme. Seven years ago, during a storm, the wires of the whole London fire service were blown down, and they were without any fire alarm for some time. Immediately after

that the post-office authorities allowed the fire department the use of their underground wires, and the result has been little or no expense in their maintenance and far better results in service. Before the London County Council the question of subways for the general use of underground wires of all kinds is under consideration, and subways are partly in use, from which the city receives rent.

The number of police on duty in London as compared with Boston is very large, and is an excellent provision, not only from a police, but from a fire, standpoint. In old London, about a square mile in territory, there are a thousand police; that is, more on duty in one mile than in the whole of Boston — 37½ square miles. The balance of the city, together with portions of the country, including territory 15 miles each side of Charing Cross as a centre, is covered by the metropolitan police, 15,000 to 16,000 in number. They come under the jurisdiction of the Home Secretary. A small portion of the metropolitan police look after the dockyards at Chatham and elsewhere.

The benefit to be derived from their system of a numerous police service is that the streets are thoroughly patrolled, and if the police do their duty the chances of a fire being discovered in its earlier stages are greater with a large number of police than with a small number. Of course, a fire may be burning in a building at night for a considerable length of time, and the smoke be drawn up by way of the roof through elevator shafts or other openings, and not be discovered even by the utmost vigilance of the police service until the building is all afire. These conditions exist in London, but in a modified form as compared with an American city. There is no doubt that the thorough patrolling of a city, especially at night, prevents large fires by giving early alarms. Boston, which, like every other American city, needs to have its fires discovered and the department notified at once, is behind London in this respect.

One never ceases admiring the building construction of London from a fire standpoint. Wooden buildings are unknown, and wood enters into the interior construction to a small degree as compared with our American buildings. The roofs are of tile, slate, or metal, and are so constructed as to be easy of access from one building to another. Shingle and inflammable roofs such as we have would be a curiosity.

Elevators are not used largely, neither are boilers for the purpose of giving steam-heat. The result is that the buildings are not cut up with elevator-shafts and openings for running steam-pipes; neither are the insides of the buildings

in winter, by the use of steam, dried in such a way by excessive heat as to make them easy food for fire. How different is it in all these particulars in America! High buildings make elevators necessary; the excessive cold of winter necessitates the use of steam-heat and fire of all kinds to such a degree that the interior of the buildings, being mostly of wood, are dried; and as we lack that moisture and evenness of climate which seem to be a feature of London, our liabilities to fire are greater than theirs, even if we were on equal terms with them in building construction.

I talked with insurance men, and, in speaking of the merits of an American city and London from a fire standpoint, they said it was a mere matter of construction. The buildings are low and small in area, and the monumental effects which we get in some of our buildings are unknown. The only criticism I heard of the London buildings was from a member of the fire department, who, speaking of some late construction, — steel beams, tiling, and brick, — called it dangerous. Buildings of that kind pass with us for fireproof.

During the last fifty years London has increased in population and size in a way that reminds one very much of an American city. Authorities ascribe this to the fact that, instead of land being leased, many holders have been selling it outright. The result is that people desirous of owning their land and houses have come in large numbers and settled in London.

Even if London had a building law only for the last fifty years, it would be to-day a city of excellent construction; but the building law runs back to the days of King Charles, and the result is a perfect city so far as buildings are concerned.

The causes of large fires in American cities are high buildings on narrow streets with large floor areas, built partially of wood. London is not troubled with buildings of this kind, even of a fire-proof construction, because as far back as 1855, and probably even earlier, the building act passed by Parliament had this clause:

"Every warehouse or other building used either wholly or in part for the purposes of trade or manufacture, containing more than 216,000 cubic feet, shall be divided by party walls in such manner that the contents of each division thereof shall not exceed the above-mentioned number of cubic feet." [1]

[1] The building law as amended in 1890, however, somewhat changed the provisions of this clause, and allowed 450,000 cubic feet to a building, by special vote of the county council, provided it is used for one business not of an inflammable nature. Openings are allowed in the party walls also under certain restrictions.

This would allow a building to be built 60 feet front, 60 feet deep, and 60 feet high. In other words, a building of this kind would contain three floors of only 3,600 square feet to a floor, provided each story was 20 feet high. If a person desired a building of larger floor area than this, he would be compelled to build a less number of stories, or if he wanted more stories he would have to build them less than 20 feet high.

With 3,600 square feet to a floor, buildings perfect in construction, no wood to speak of, the chances of large fires are small in the extreme. Contrast this with the large inflammable buildings which we have, many of them running over 50,000 square feet to the floor, with six or seven stories of equal area loaded with inflammable goods, and you have the easy task which lies before the London fireman, and the herculean task which faces the American fireman.

The largest store of its kind in London is Whiteley's, a large retail dry-goods house. Instead of having large open floors, acres in area, it is divided into numerous low and small buildings, averaging less than 1,000 feet in area to a floor, each building divided by brick walls of great thickness, and with double iron doors where openings are made from one store to another. Its lowness (a characteristic of the London building), the thick brick walls dividing it, the small areas of floor, and the sample-like appearance of its stock, would make it an easy building to handle in case of fire by an American department; yet it has had numerous costly fires, even from an American standpoint.

I noticed one other thing which shows the good business judgment of the mercantile community of London. This is a tendency to divide a large business into separate departments, using one building for storage purposes, another for manufacturing purposes, and a third for showing the stock for sale. The tendency in an American city for using a building not only for sale purposes, but for storage and manufacturing, is not general in London. The result is a decrease in the fire hazard.

Another important practice of theirs is that of not having large windows in their buildings. Their buildings do not present so much glass area in the front and sides as with us. When a fire occurs it is easier to confine it within the building, as the small windows do not present such opportunities for large volumes of flame escaping and setting fire to buildings on the other side of the street.

I have been at some pains to look into the question of the extension of fires in London from one building to another. Of the fires occurring while I was there, quite a proportion

were large, and extended to buildings other than that where the fire originated. Three days after I sailed, on July 18, a fire occurred which involved 50 buildings, 40 of which were destroyed and 10 partially so. The loss according to the newspapers was $7,500,000 — an enormous amount from a London standpoint. The section where this fire occurred I had been through several times. It is in the heart of the city, close to the Mansion House and to the Bank of England. The buildings were low, well constructed, and small in area, and the only difficulty that they presented was the fact that they were partially stored with goods of an inflammable nature. The only way that I can account for such a disastrous and extensive fire occurring in the heart of London among such small buildings is the fact that it was allowed to get great headway, owing to un-American methods of the London service. They are apt to place too much reliance on their building construction, and the slow burning of their fires. The fire service of London, excellent though it may be in many ways, is modelled with the idea of putting out most of the fires that occur, but it is not able to cope with large fires. What we want is their building construction, and what they want is our fire-department methods. There is some excuse for us because of the newness of our country, the rapid growth of our cities, and the fact that our age of wood is not a thing of the past. For London, the capital of a great country, the mechanical ability of whose people is unquestioned, whose common sense is shown in many ways that go to prevent fires, there is no excuse for its not adopting American fire-fighting methods.

It might not be out of place for me to say that I am on record while in London as giving my opinion of the London brigade to a prominent officer of a large insurance company. It was as follows: "That the department had not enough men, its apparatus was not heavy enough to cope with large fires, and that, although they had been more or less fortunate for some time past, yet, even in London, admirably though it was built, there were opportunities which might arise at any moment, and the service would not be able to cope with the crisis." I am free to admit that I do not believe my opinion had much weight at that time, for it is to the credit of London citizens that their service stands high in their estimation; yet my judgment was borne out in fact after my departure by the results of the fire which I have quoted above. The chances for large fires are not so numerous in London, because of construction, as they are with us; yet, because of their service, which is modelled for fighting small fires, there are many opportunities. The changes in

business methods in America have increased our fire risk enormously in twenty years, and even in conservative London they have made the conditions different from what they were twenty and thirty years ago. It seems to me as if the authorities there had not realized this fact.

I was at a considerable disadvantage in Paris owing to my small knowledge of French, and at times it was necessary to pursue my inquiries through an interpreter.

The area of the city is about 30 square miles and the population 2,500,000. It has beautiful squares and streets of more than average width. This is owing mainly to the relaying out of the city some years ago. The water service is good for a continental city, the engines connecting directly with the hydrants. The buildings, although tall, are small in area.

The fire department consists of over 1,700 men of the French army under the usual officers, — colonel, majors, captains, etc. The men are young, but not as powerful-looking as those in an American service. Every three years the rank and file practically change, owing to the expiration of the army service term. They have a system, I was informed, which allows men to serve longer if they desire, and in this way, as the service is considered easy, they manage to keep many men of experience.

I inspected their drill school. In a modified form it resembles an American school, yet it is not of so high a grade or so far-reaching in results as one of ours.

They have about 12 fire stations or barracks in the whole of Paris. Connected with these or close by are the fire-houses, some of which are modelled on the American plan, with sliding poles, hanging harnesses, all complete, as introduced by them some few years since.

The engines have double pumps some 12 or 14 in number, with a capacity of from 300 to 400 gallons a minute. They are excellent in their construction.

The hose is carried on reels attached to wagons, and in the barracks, in addition, they have ladders stored which are drawn to fires by horses. They use hand-pumps and other small appliances to a great extent. Their large ladders are about fifty feet in length when extended; some of them may be a little longer. A few men can handle them, but their methods are slow and complicated. The construction of the ladders, and the method of throwing them, render it impossible to place them in position at a fire with celerity.

I looked in vain for pompier ladders. It is a popular belief on our side of the Atlantic that the American pompier

ladder had its origin in France. If such is the fact, strange to say, the French people know nothing about them. They have a short ladder of the regular style, with a long hook on each side, which they use to scale with from one balcony to another. Their buildings are constructed in that way. This may have given the idea to America; but America has so improved upon it that even its originators would not recognize it.

The use of ropes, life-belts, etc., as practised in American departments, is unknown in Paris. Speaking of the American method of using ropes in saving life, as shown at the congress of firemen in London, a captain of the Paris department expressed to me the greatest surprise at the ability shown by the American fireman. The rope drill, as practised by us, is utterly unknown either in England or France.

Siamese streams are not used in Paris. Once they had the appliances, but they claim they found no use for them.

The American system of shut-off nozzles, and all those modern ideas of fire-fighting, which, in the aggregate, do so much to make a service efficient, I failed to find in either London or Paris.

The hose used principally in Paris — and in this respect it is behind London — looks like a linen fabric unlined. They use some small lined hose, but I saw very little of it.

Paris, like London, has no wires or poles on its streets to interfere with the proper working of its department at fires. There are some overhead wires, but these are carried in the least objectionable way to the firemen — on structures over the roofs of the buildings.

There are but few fire-alarm boxes in Paris. These are small, with glass fronts, placed in a way that makes them hard to find. In addition, they have over a hundred stations scattered over the city, where they have small appliances and a few men. No outsider is allowed to enter the barracks of the Paris department without the consent of the commanding officer. After getting a written permit from the colonel in charge, I was shown the operations of the department by a captain in the service. I asked to be taken to one of these small outlying stations, and he said that there was nothing to see there, that they were doing away with them.

They are putting in a new fire-alarm system which consists of short posts, each about four feet high, on top of which is a square iron box with a glass front. The idea conveyed by the sign attached to it is that the citizen giving the alarm must wait until the apparatus responds.

In these boxes are telephones which, on breaking the glass, allow citizens to send in an alarm of fire. The sup-

position is that by this means they are able to get more detailed information of what is wanted. As far as I could find out, it was a peculiar kind of telephone, which would not allow the fire headquarters to talk back to the party giving the alarm. They could make a signal which would notify that an alarm had been received all right, and that is all. If such is the case, it seems to me that if this telephone system is to be used at all, it should be of such a nature as to admit of conversation backward and forward between the party giving the alarm and the party receiving it. As fast as these boxes are placed in service, the stations, whose places they take, are abolished. The eventual result of this system, if carried out, will be that Paris will have a large number of telephone stations from which to send in alarms of fire. The system, though not perfect, is yet worthy of consideration. In my supplementary report I shall give a more detailed account of it.

A difficulty in all great cities, which we have felt first in America, is that of numerous fires occurring at one and the same time. London and Paris have been trying to cope with this difficulty, but the methods which they follow are not such as meet the case. The time is not far distant when London and Paris will be compelled to follow our example.

When an alarm is received in a Paris station it is sent out in a manner somewhat similar to that of the London department. They have the same circumlocution in receiving the alarm and notifying the various district headquarters and in sending back for more help by messengers. The same criticism can also be made of their service as of the London, viz., the impossibility of centralizing it at a moment's notice and using all the men and apparatus if needed. It is a peculiar fact, yet true, that, although the French have many American appliances for quick hitching and getting their apparatus to a fire, while they connect directly with the hydrant and have their hose joined together ready for use, they fail in many ways. Their horses are not trained to run out to the harnesses, the halters have to be unhitched, and the men lead the horses out by hand. The engines have no method of keeping on steam while in quarters, and they do not make ready for use until after they arrive at a fire. There is an absence of that snap and vigor which characterize an American service. It strikes me that the men are in the same position that we would be in if new and strange machinery was imported into one of our large mills and we had no men who were familiar with its operation. It would be necessary for us to import skilled labor from the country whence the machine came or wait until the intelligence of

the American mechanic found out the secret. What they need in Paris, in addition to copying our ways and methods, is the ability to utilize them to the best advantage.

When the Paris apparatus goes to a fire, it is in no great hurry. On arriving the men run off a line of unlined hose which looks to be $3\frac{1}{2}$ to 4 inches in diameter. At the end of this large hose they have a brass cap which they screw on, and from this run small lines of hose, a trifle larger than ordinary garden hose. They can use two lines, possibly more, in this way from one large line of hose. Some of the small hose is rubber and some of it linen unlined, and with this kind of hose they fight a fire. The size of their engine streams varies from five-eighths of an inch to one inch. As they use unlined hose, with its faulty delivery and tendency to leak, and as the couplings are somewhat on the key-clutch principle, they cannot get efficient water-streams. In America we are particular in the extreme not to allow hose to leak when carried through buildings, yet in Paris they seem to think nothing of this particular point.

Fires very seldom extend beyond the room in which they originate, and the cases are rare in which it gets from one building to another. I was present at a small fire which took place in the basement of a hotel, with small stores in the lower story, and on the stories above were suites for tenants. It was curious to see the people looking down from the windows above at the firemen at work in the basement, apparently not in the least disturbed. They could do it with impunity, for the buildings are not built to burn. The firemen had an arrangement similar to an air-pump which supplies a diver with air, and were working it to furnish air to those who were in the cellar below. The smoke that came out from the cellar did not amount to anything in volume, and for about half an hour the apparatus and the men stood around there, and finally, when the fire seemed to be all out, a man came out who had over his head a diver's helmet made out of light metal. He evidently was the one who was in the thick of the smoke and to whom the air was being pumped. After him came more firemen, and in their hands they had the cause of the fire, about a bushel-basketful of excelsior, part of which was burned.

My stay in Paris was a little over a week, and during that time I saw considerable of the fire service. The arrangement for furnishing air to those in cellars, such as they had on their apparatus, struck me as being too heavy for a man, especially in some cellars such as we have. The idea impressed me as excellent, and possibly might be

used in American cities in cellar fires which did not travel fast.

On all their apparatus the French carry oxygen for the purpose of reviving those who may have been affected by smoke. Here again is an excellent idea, but of its practicability a medical man would be best able to express an opinion.

In their methods and as scientific fire-fighters, the French are somewhat like the English. Neither London nor Paris has had the daily practical experience that the American fireman has. We have learned the trade scientifically from daily combat with fires, unequalled in their fierceness and danger the world over, because of the construction of our cities. It is not science to use the hose they do, and it is not science to have a body of supposed trained men looking after the fire interests of a great city like Paris change so constantly. The trained, scientific fireman comes only with long years of practical experience. In this, both London and Paris seem to be sadly wanting.

The buildings of Paris are better than those of London. Although higher, they are so arranged that all the rooms appear to have windows opening out of doors, and they are erected around interior courtyards. These courtyards, together with many open spaces and broad streets, allow the fire department to reach fires easily and quickly.

The officers and men of the Paris department, like those of London, know nothing about the construction of buildings, neither do they make inspection of them, nor are they by rule compelled to have a knowledge of their interior or exterior construction. The London service is under civilians, and some people may give that as a reason for its action, but the Paris service is military, and so much is claimed for the military, that it is a strange comment that this most essential thing in fire-fighting, viz., that the officers at least should inspect and know their buildings, is completely ignored in Paris. They have plans on file at the headquarters of the public buildings and of theatres, and this is the nearest they come to paying any attention to building construction. I asked an officer how they found their way in a building on fire, and he replied that the owner or somebody round there showed them.

Paris uses the army for a fire department, in my opinion, first, because of its cheapness; lastly, in order that so large a body of men may come under the jurisdiction of the national government, not the municipality of Paris. The police come under the national government for the same reason.

The life-saving appliances in Paris, from my limited examination, can bear no comparison with those of an American city. They are not even abreast of the London service; in fact, the engine and fire appliances of Paris would hardly be large enough in number for an American city of 100,000 population, and would not be for Paris, were it not for the wonderful building construction.

In my opinion, it would be well for us to consider the question of a heavier system of policing and patrolling on the part of the fire department in the extreme hazardous sections of Boston. If foreign cities find it beneficial, why not Boston?

In the engines which I saw in England, outside of London, the idea of having three pumps seemed to me to be an improvement on the average two-pump engines. In Paris, they have in service boilers on their engines of a water tubular pattern. Attached to the boilers is a light condenser to exhaust the steam back into the boiler, or they can exhaust into the air.

It might be possible for an engine to be built with three pumps instead of two, and by adopting the system of water tubular boilers, get better results than we receive from our engines. The gain from an engine of this kind would be economy in the use of fuel, lightness in weight, and large water-throwing capacity.

Water tubular boilers, I understand, have been tried in England in connection with fire-engines, and it is claimed that they are a success. We might submit the question as to the feasibility of this proposition to the engineer of the city of Boston. In this connection it would be advisable also to have a scientific test made by him of the number of gallons per minute the engines of the Boston fire department are able to throw on a fire, not alone in theory, but in actual, practical work. The result of this test would best show the wisdom of trying this new system of engine. In connection with this test, the principles of getting the best results from two-way, three-way, and four-way siamese streams could be obtained; in fact, the whole question of water delivery could be investigated, especially the subject of a lighter substitute for the present heavy suction used in connecting an engine to the hydrant.

There is no doubt that the great danger of Boston in the future is from the faulty construction of the past. It is essential that not only the officers, as is now the case, should have a thorough knowledge of construction of buildings, but that as far as possible it should extend to the men. Our patrol system makes it possible for a man to know the con-

ditions that surround buildings on the outside. By allowing them access to maps it is possible for them, in theory, to obtain a knowledge of their inside construction. It seems to me that when promotions occur hereafter, it would be advisable to embody as part of the subjects in which the men should be examined, their knowledge of the results obtained from water, as developed by the tests which I have suggested, and also their knowledge of the outside and inside construction of buildings in the district where they have done duty.

I noticed in Paris, in some of the large buildings which I personally examined, there were men attached to the store, who were formerly members of the Paris brigade. Their duty, I was informed, was to patrol all the floors of the building, and see that the goods were so placed, and everything carried on in such a manner, that the danger from fire was minimized. This is an idea that can be enlarged upon here in Boston. In each of our large establishments that are considered hazardous, a fire department can be formed out of the employees, and the organization be made under the supervision of an officer of our fire service. To get the best results from such an organization, it should be inspected at stated intervals by a fire official. This inspection should extend to the fire appliances of the building.

I have examined the building laws of Paris and London, as well as the laws governing explosives and petroleum, also their system of inspection, and other matters of importance, and will submit, as soon as possible, a separate report upon those subjects.

SUPPLEMENTARY REPORT.

There is no way of ascertaining the actual fire losses on property in London. The fire brigade keeps no record. They say that it is not their business to do so. Unlike us, they give no attention to this point.

It is also absolutely impossible to obtain exact figures of the losses of insurance companies, for any year or series of years. It is the custom of every company (with some exceptions) to publish full particulars of its receipts and loss payments as a whole, at home and abroad. But no company thinks to make public its experiences in any London district. The reason for this is, that if the experience be an adverse one, the company can quietly curtail its operations in that district; and if favorable, it can continue to make a profit without attracting too much attention. The correct figures, doubtless, are in the hands of some insurance managers, but they do not make them public.

London is divided for insurance purposes by each company into practically three sections: the West End, for good residential property; the city, for large wholesale and retail warehouses, and storage risks; and the East End, for manufacturing and residential risks.

The residential insurances are on a good paying basis. Although the rates vary from $\frac{1}{6}$ per cent. to 2 per cent., the loss ratio of the larger companies fluctuate between 5 and 15 per cent. of the gross premium income of these West End branches. This statement applies to three of the principal insurance companies of London. Separate figures for the East End and city cannot be obtained, but the combined percentage for London is estimated as follows:

During the last ten years the percentage of losses has fluctuated between 40 and 60 per cent. of the premiums. The loss for last year is estimated as not exceeding 50 per cent., and it varies from about 25 per cent. in one company to about 70 per cent. in two other prominent companies. This is based on the judgment of authorities. It is not too much to estimate 50 per cent. of the premiums as the loss.

This is about the same showing on insurance profits as that made by the Boston insurance companies during the last ten years, with this difference, that the insurance rates are at least twice as high in Boston as they are in London.

The yearly premium receipts for the London district in detail it was impossible for me to obtain, but it may be calculated on a basis of $\frac{3}{6}$ per cent. on the total insurance of the companies, based upon their contribution to the support of the London brigade. This would be about £1,432,000. The insurance companies are desirous of making as large a profit as possible in London, because the business there is usually reckoned to cover deficits in what they call the provinces and abroad. The business of the fire offices for the country and abroad shows a total loss of 13,000,000 on a premium income of 19,000,000.

The insurance commissions paid to agents are reckoned at about 16 per cent. The expenses of management, it is claimed, are 18 per cent.

According to the annual report of the London Salvage Corps, which is supported by the insurance companies to look after their property, it is estimated that 25 per cent. of the total number of fires in the metropolitan area have no insurance. This is an extraordinarily large proportion, but the statement, coming from such an authority, cannot be questioned. Many small householders and business firms do not insure at all.

The salvage corps' report draws attention to several peculiarities in fire risks. In 11 years the number of fires has increased 60 per cent., and the serious fires have fallen from 14 to 6 per cent. The claim is made that this result is caused by the special attention given to the isolation of portions of large warehouses and storage premises, and also to a lately introduced system of patrolling and inspecting under the directions of the fire-insurance managers. The best results have been shown in wharf and warehouse business.

As near as I could ascertain, what they call warehouse business means a business carried on in any building occupied by a firm in the dry goods, furniture business, etc.

They seem to have had a somewhat similar experience in London to what we have recently had in our American cities, doubtless coming from the changes in business methods, to which I have heretofore alluded.

About two years ago, the centre mile in London, around the Mansion House, was yielding large fire losses in what they called "warehouses," dealing in Manchester goods of a nature similar to dry goods. The insurance was raised 50 per cent., the results showing a loss even then; and while I was staying in London the companies were considering the question of making a still further increase of 20 per cent. on insurance rates. Their method of increasing the rate was to take every warehouse dealing in Manchester goods, and

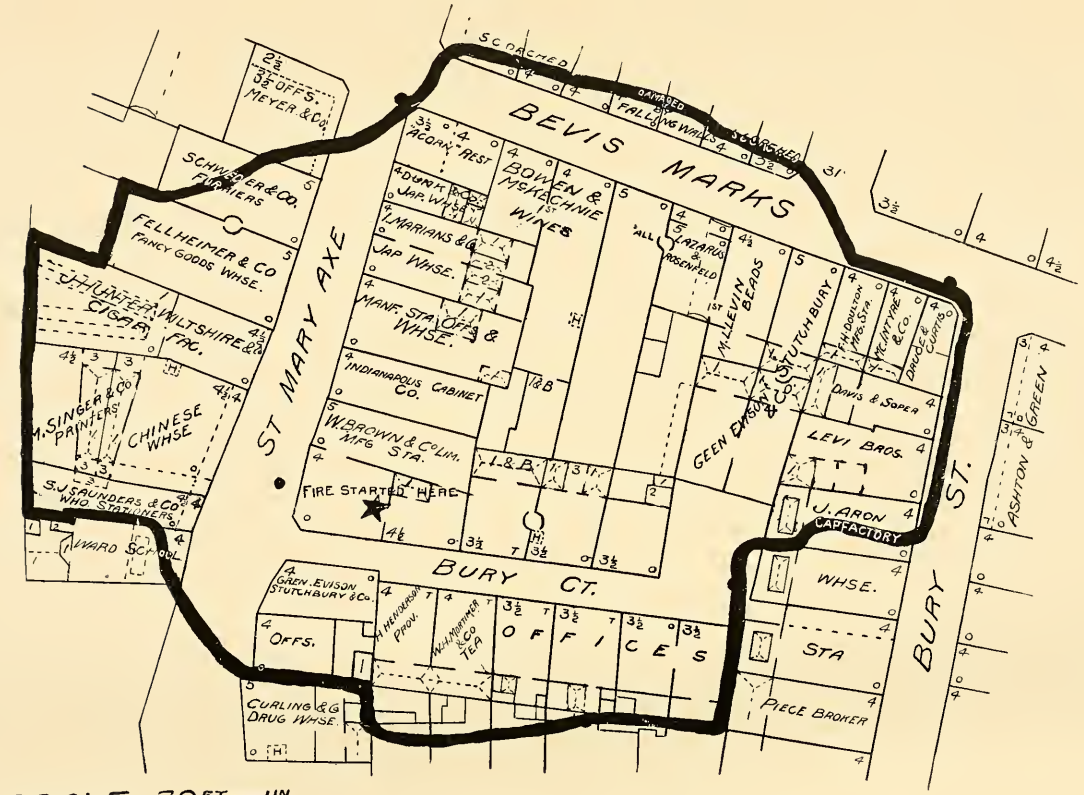
raise the premiums in the proportion that I have mentioned. But they did not apply this increase to every business building in the district.

I found it impossible to obtain definitely the number of fires in London causing a loss of over $25,000, but doubtless those marked "serious" in the brigade report are above that amount. In regard to notable fires, the reports of 1892 will show the cases of extension from one building to another. The construction of their buildings is of such a nature that the losses are confined generally to the building in which the fire originates, although during my short stay there were a number of extension fires fully as large as would have occurred during the same time in any American city.

For many years London has been singularly free from disastrous fires. Recently, however, she has had a different experience. The history of fires in great cities is more or less similar. They may have years free from conflagrations, and then they come with a vengeance. London has been no exception to the rule.

It has been said again and again that conflagrations were limited to American cities, owing to the wooden and careless construction. London has been held up for our edification. Yet a week or so ago they had a large conflagration, and a few days later they had another. Of the latter one it has been impossible for me to obtain the exact losses, owing to the peculiar methods that characterize the fire brigade's records. In this fire, the newspapers claim that the losses are between seven and eight millions. (See Plate No. 1.)

The accompanying plan of the fire was sketched and afterwards verified by a competent engineer. The amount of territory burned over was large. Forty buildings were destroyed, and 20 partially so. The buildings were all very small in area. The heights of the buildings ran from $3\frac{1}{2}$ to 5 stories, very few of them the latter height. The buildings were well constructed, in many cases occupied by offices, and presented no great difficulties in case of fire from the construction standpoint. The fire started in the corner of the building, at the point marked by a star, in the stationery shop of William Brown & Co. Owing to the slowness of the methods characterizing the fire departments on the other side, and the inflammable contents of the building, the fire, doubtless, got great headway. Even under these drawbacks it would seem, however, that, with so many partition walls, the fire should have been confined to its point of origin. If in such buildings as these in London, which are built not to burn, a



SCALE 70 FT = 1 IN

PLAN OF FIRE IN

LONDON.

Plate No. 1.

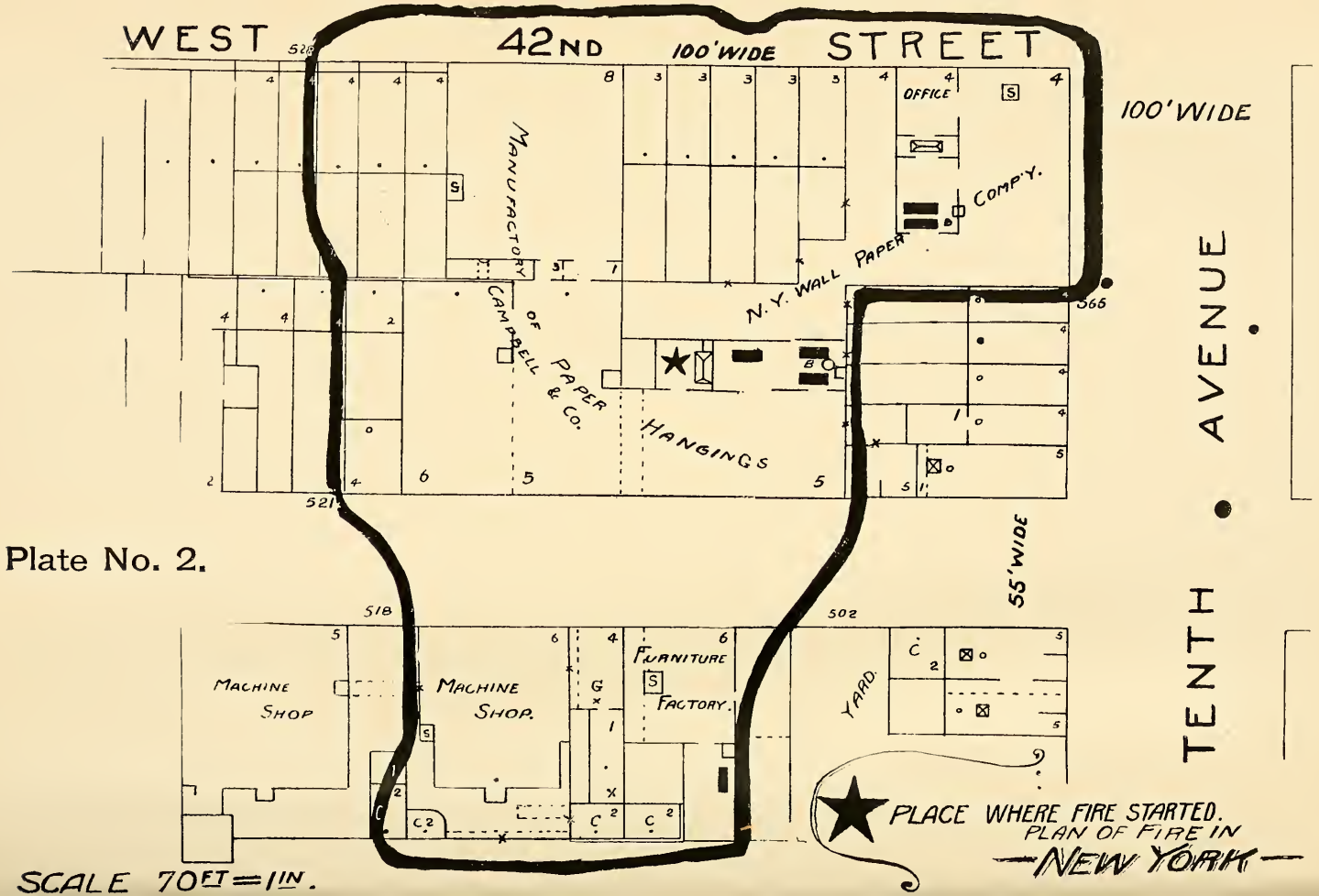

WEST 42ND STREET
100' WIDE
100' WIDE
TENTH AVENUE
55' WIDE
OFFICE
COMP'Y.
MANUFACTORY
CAMPBELL PAPER & CO.
N.Y. WALL PAPER
HANGINGS
MACHINE SHOP
MACHINE SHOP.
FURNITURE FACTORY.
YARD.
521
518
502
366
PLACE WHERE FIRE STARTED.
PLAN OF FIRE IN NEW YORK
SCALE 70 FT = 1 IN.

Plate No. 2.

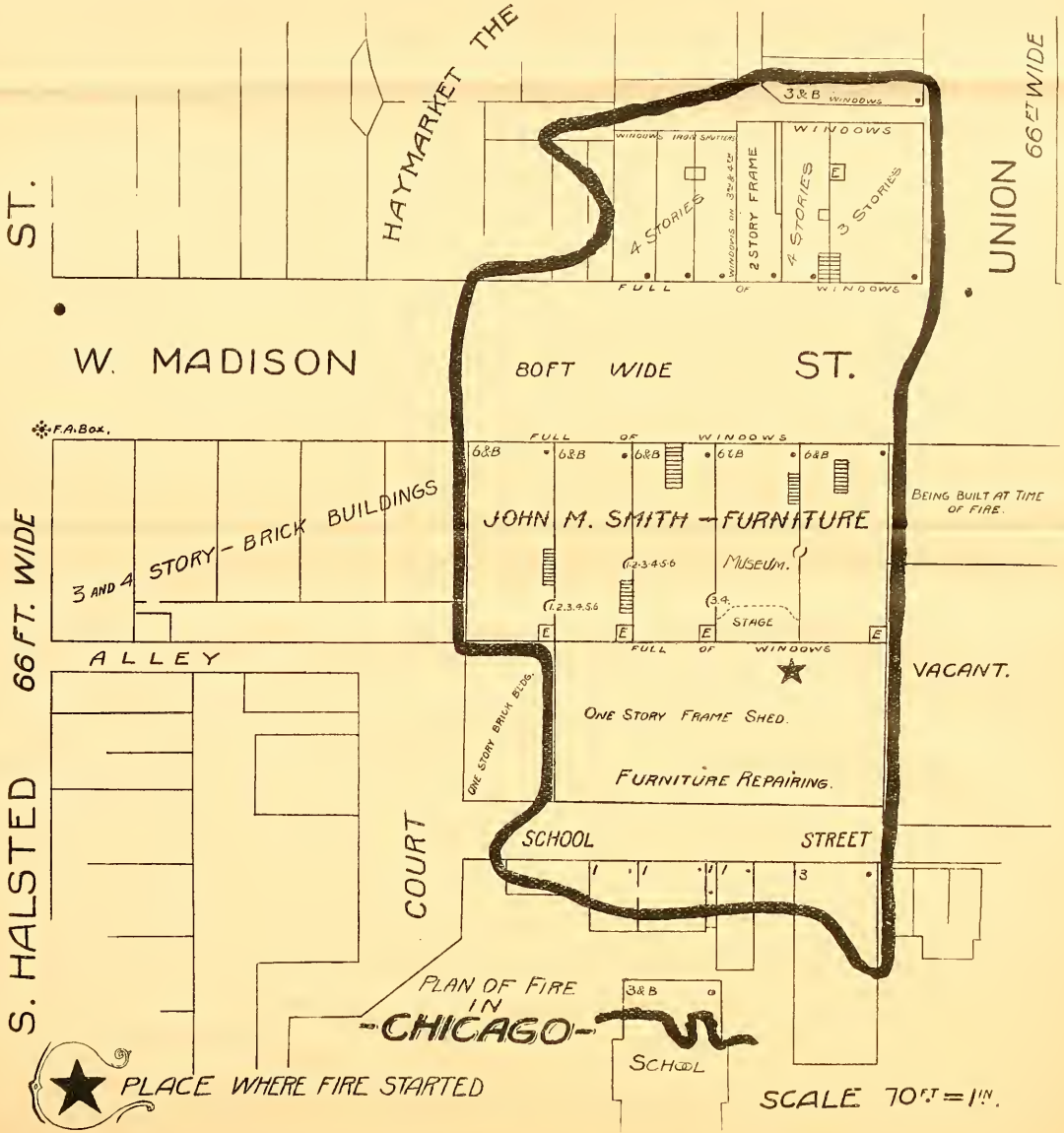
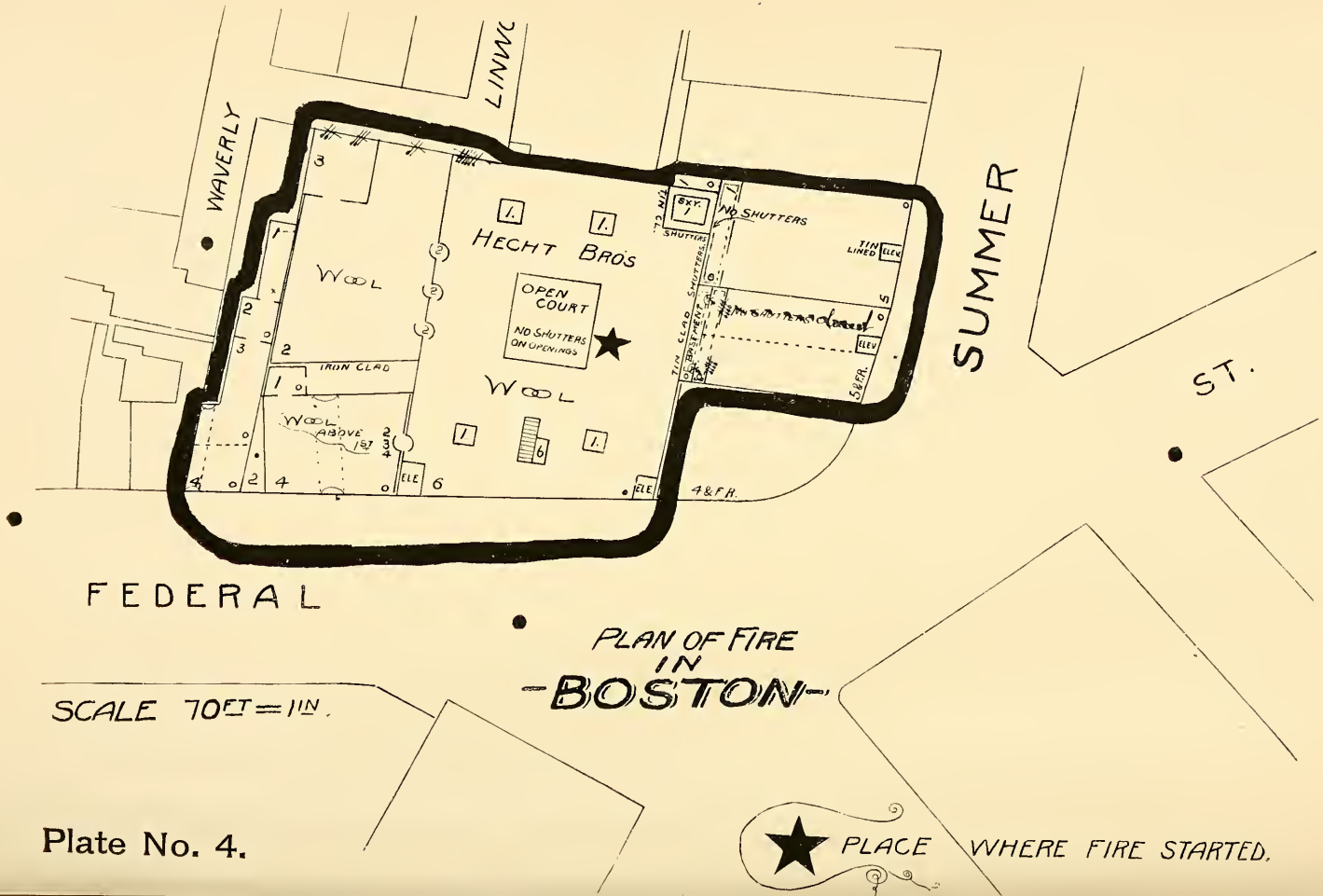

ST.
HAYMARKET THE
UNION
66 FT WIDE
3 & B WINDOWS
WINDOWS
WINDOWS IRON SHUTTERS
WINDOWS IRON SHUTTERS
4 STORIES
2 STORY FRAME
4 STORIES
3 STORIES
FULL OF WINDOWS
W. MADISON
80 FT WIDE
ST.
F.A. Box.
FULL OF WINDOWS
6 & B
6 & B
6 & B
6 & B
6 & B
JOHN M. SMITH - FURNITURE
BEING BUILT AT TIME OF FIRE.
3 AND 4 STORY - BRICK BUILDINGS
1-2-3-4-5-6
MUSEUM.
1-2-3-4-5-6
3-4
STAGE
E
E
E
E
FULL OF WINDOWS
ALLEY
66 FT. WIDE
VACANT.
ONE STORY BRICK BLDG.
ONE STORY FRAME SHED.
FURNITURE REPAIRING.
SCHOOL
STREET
COURT
S. HALSTED
PLAN OF FIRE IN -CHICAGO-
3 & B
SCHOOL
PLACE WHERE FIRE STARTED
SCALE 70 FT = 1 IN.

Plate No. 3.



PLAN OF FIRE IN -BOSTON-

SCALE 70FT = 1IN.

Plate No. 4.

★ PLACE WHERE FIRE STARTED.

disastrous fire of this kind can occur, the wonder is that in American cities, with their large-area buildings and wooden construction, we have not had greater conflagrations.

The history of fires in New York, Chicago, and Boston shows somewhat similar results. A few days ago New York (if you will remember) had a large fire, the loss upon which, according to reports, was over $2,000,000. I say, according to reports, because the final results, doubtless, will curtail that figure. (See Plate No. 2.)

I submit a plan of that fire. The star marks the place where the fire started in Campbell & Co.'s paper-hanging establishment. The unbroken floor area of the building where the fire began was large. The result was inevitable, with such a large area filled with inflammable material. A great volume of flame was produced, and although 46 pieces of apparatus were on duty, the flames jumped a street 55 feet wide, and burned over 20 buildings.

If at this fire there had been other large-area buildings adjoining the territory burned over, it would have required all the efforts of the excellent New York service to have prevented further spread, and it is a question whether they would have succeeded in so doing.

I submit a plan of a fire in Chicago that occurred some time ago, which still further illustrates the dangers from large floor areas and ill-constructed buildings. The star shows where the fire started. It began in a one-story frame shed in the rear of a block of five buildings full of windows, and from this block the flames jumped a street 80 feet wide and burned the low buildings on the other side, three and four stories high; also the low buildings in the rear, on the other side of School street. The number of buildings affected in this fire was about 20. (See Plate No. 3.)

Here, again, was a case that, owing to the fact that in the neighborhood there were only low three-story brick buildings, the fire did not extend farther. The number of engines at this fire was thirty-four. It required the united efforts of a large part of the Chicago service to stop this conflagration.

We have, as you well know, the same trouble in Boston that they have had in New York and Chicago; but our large floor area buildings appear to be more poorly constructed than in the latter cities, and we are unfortunate in the sense that they are in the neighborhood of other large-area buildings, and are surrounded by narrow streets. I submit a plan of the Hecht building fire. (See Plate No. 4.)

The point where the fire was supposed to have started is shown by the star. It jumped across the small passageway (over the skylight), 8 feet in width, into the Summer-street

building, which had no shutters. By the falling of the walls the fire went into the building next the one without the shutters, also into the annex buildings on the Federal-street side, connected with the main building by iron doors. The construction of this building was the usual American construction which characterized buildings fifteen years ago, — plenty of wood, some iron and brick.

These three fires owe their spread to the vast volume of flame generated in a large floor area. In view of the construction of the buildings, and of the result of these fires, a great deal of credit should be given to the respective fire departments, especially so when we compare the fires with the plan of the fire in London, which spread as far and destroyed more buildings. With us they would be considered, from their small size, numerous brick partitions and good construction, extremely easy to handle in case of fire.

I personally inspected six of the most difficult "warehouse" risks in London. The business is similar to our large retail houses. The following are the risks.

The Army and Navy stores pay an insurance of thirteen shillings to a hundred pounds:

	Insurance.
Whiteley's (special)	21s.
Maple's shop and stores	10s. 6d.
Shoolbred's	13s.
J. & R. Morley	9s.
Hitchcock Williams	11s.

The plans of these buildings show the benefit accruing from the building laws, which limit not only areas, but the heights of the buildings, by the clause which says, "the cubical contents of any building shall not be over 216,000 feet." This law also compels the use of fire-proof material, and limits the style of doors that shall be cut through walls.

My personal inspection of these buildings showed that the floors were generally of concrete, the roofs of slate or metal, the ceilings concrete, arched bricking used everywhere, openings made in the walls protected by double steel doors, party walls of great thickness, subways from one building to another rather than passages overground, — in short, everything was done to produce perfect construction. The reason for this action of the occupants was that they might obtain low rates of insurance. Yet with all this excellence of construction in London, there are many large houses, as in Boston, who have to go abroad to obtain all the insurance they want.

The buildings of Maple & Co., upholsterers, cabinet-

building, which had no shutters. By the falling of the walls the fire went into the building next the one without the shutters, also into the annex buildings on the Federal-street side, connected with the main building by iron doors. The construction of this building was the usual American construction which characterized buildings fifteen years ago, — plenty of wood, some iron and brick.

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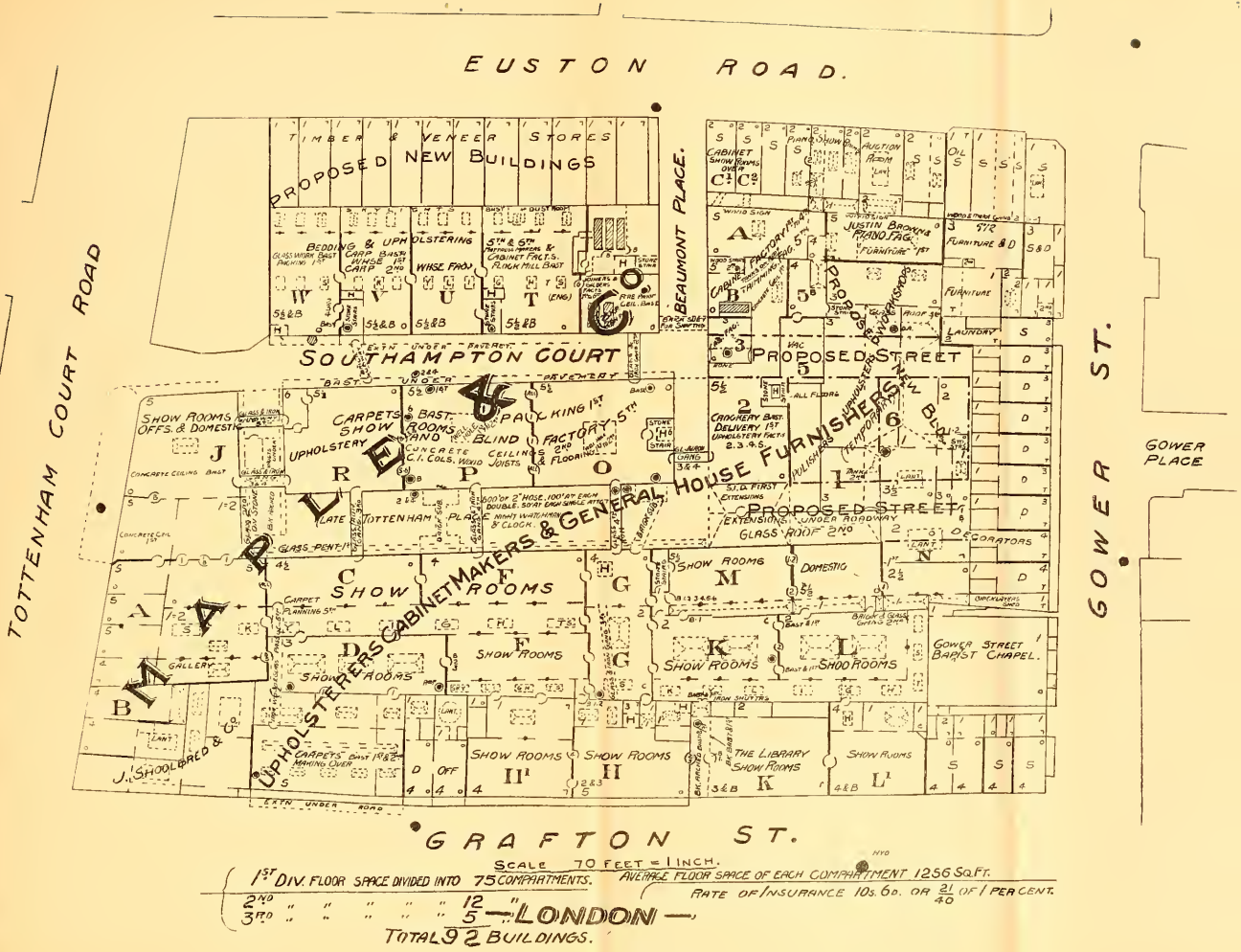
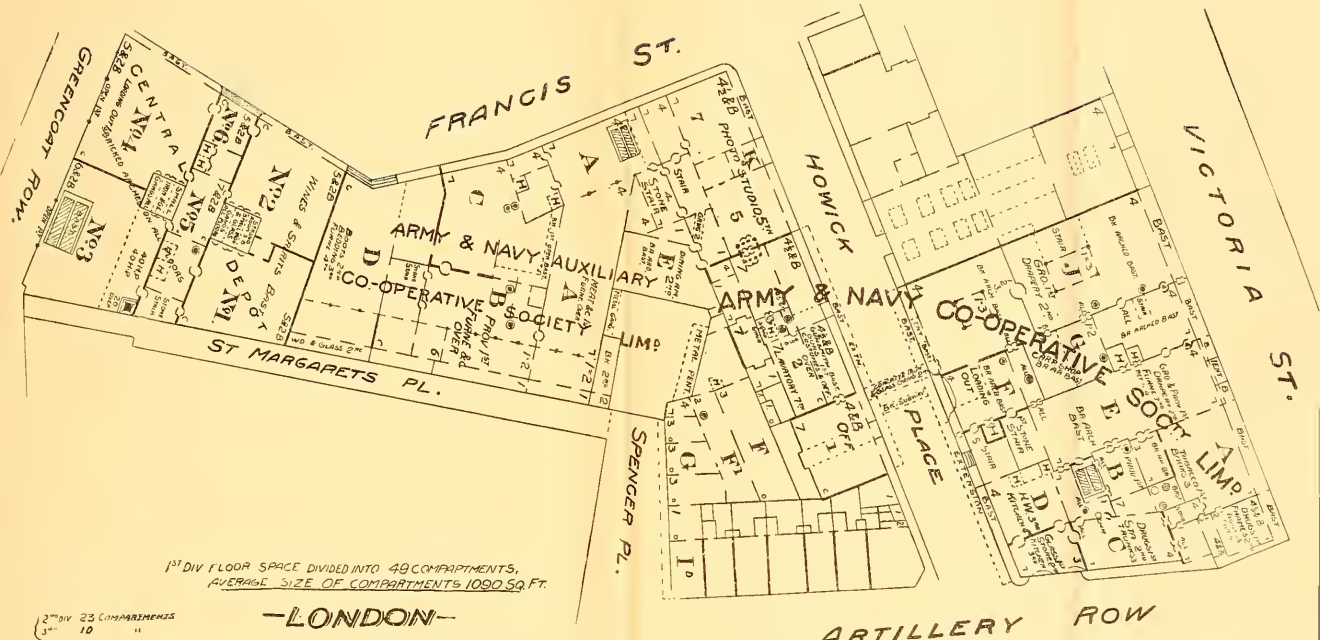
The buildings of Maple & Co., upholsterers, cabinet-



SCALE 70 FEET = 1 INCH.

Plate No. 5.



1st DIV FLOOR SPACE DIVIDED INTO 49 COMPARTMENTS,
AVERAGE SIZE OF COMPARTMENTS 1090 SQ FT.

2nd DIV 23 COMPARTMENTS
3rd " 10 "

—LONDON—

SCALE 70 FEET = 1 INCH.

RATE OF INSURANCE 13s OR 13/20 OF ONE PER CENT.

TOTAL NO. OF BUILDGS. 82

Plate No. 6.

makers, and general house furnishers, are divided into three divisions. I found the construction well-nigh perfect from a fire standpoint. In addition they seemed to have provided every appliance in the way of hose, night watchmen, etc., for meeting any possible emergency. (See Plate No. 5.)

The average area of each building in division 1 is 1,256 square feet; the heights of the buildings vary from 3 to 4 stories, and in some instances they are 5 stories high. The stories are excessively low studded, and the 5-story building in this case, as in most London buildings, appears to be not higher than an average 3-story building in America. The total number of buildings occupied by Maple & Co. is 75 in one division, 12 in another, and 5 in a third. The result of having so many buildings divided by brick walls, with double iron doors covering the openings (and the size of these doors limited), is the general prevention of the spread of fire beyond the building where it originates.

The theory of the construction of all large buildings in London is to be praised. It is the same principle which makes the modern ocean steamer well-nigh unsinkable. A series of water-tight compartments, with all connections provided with doors, has robbed the sea of many of its dangers. The same principle, with fire-proof construction, applied in buildings in London, has prevented the disastrous fires from large floor area buildings by which American cities have suffered.

A few of the marked characteristics of Maple & Co.'s are concrete ceilings, in many cases stone stairs, windows protected by iron shutters, and the isolation of the dangerous portions of the business in specially constructed buildings, so that in case of fire that particular portion of the business would be injured and no other.

What is true of the construction of Maple & Co.'s is equally true, to a greater or less extent, of the plans of five other buildings.

The Army and Navy Coöperative Society carries on general stores somewhat similar to one of our large retail dry-goods houses. One portion of their business is in stores between Victoria street, Howick place, and Artillery row; the other portion between Francis street, Howick place, Spencer place, Greencoat row, and St. Margaret's place. The average area of the buildings in the first division is 1,090 square feet; the total number of the buildings is 49 in the first division, 23 in the second, and 10 in the third. The heights of the buildings are 3 stories, 4 stories, and in a few cases 5 stories. (See Plate No. 6.)

In the examination that I made of these stores, it struck

me that their construction was a little better than the average London building. They were provided with brick arches, stone stairs, numerous thick brick partition walls, and an isolation in separate buildings, with brick arched floors of the departments where danger was to be expected from fire. The streets were fairly wide, especially so when the heights of the buildings are considered. In the immediate neighborhood there appeared to be no other large buildings. This reduces the danger.

In William Whiteley's stores there have been many costly fires in times past, involving large losses, yet, owing to the method of subdivision into numerous small buildings by partition walls, the fires have never completely destroyed the whole property. It is divided into two distinct parts by Douglass place, under which subways are run. The total area of one part is 70,400 square feet, and it is divided into 109 buildings. The area of part 2 is 72,000 square feet, divided into 40 buildings. Owing to the fact that the rate of insurance paid upon these buildings is 21 shillings, and the reputation they have enjoyed for large fires, my examination was very thorough. The portion of the stores facing on Queen's row are of first-class construction, — concrete, stone floors, walls of great thickness, double doors protecting openings in the wall, and brick arches in the basement. In short, everything seemed to have been done to prevent the spread of fire. (See Plate No. 7.)

Whiteley's stores are considered the most extensive of their kind in London. This business is like that of Jordan, Marsh, & Co , or R. H. White & Co., or even a little more extensive, as he deals in oils, paints, provisions, and flour, and has a book-bindery, a butcher shop, and other things that seem a little out of place in a dry-goods store.

If the same buildings were in Boston they would be considered a cheap fire risk. The owner, however, I am informed, has been unable to get all the insurance he wanted. The height of the buildings is so low (in some cases they hardly average as high as an ordinary American dwelling-house), and their construction is so good, that the fire department, either in Boston, New York, or Chicago, would have no trouble in preventing much damage in case of fire.

The business quarters of Shoolbred & Co., drapers and house furnishers, face on Tottenham-court road, 82 feet wide; Grafton street, 49 feet wide; Huntley street. 45 feet wide; and University street, 44 feet wide. Four stories is the average height of all the buildings, and very low stories at that. Measured by the eye, they appear to be about 50

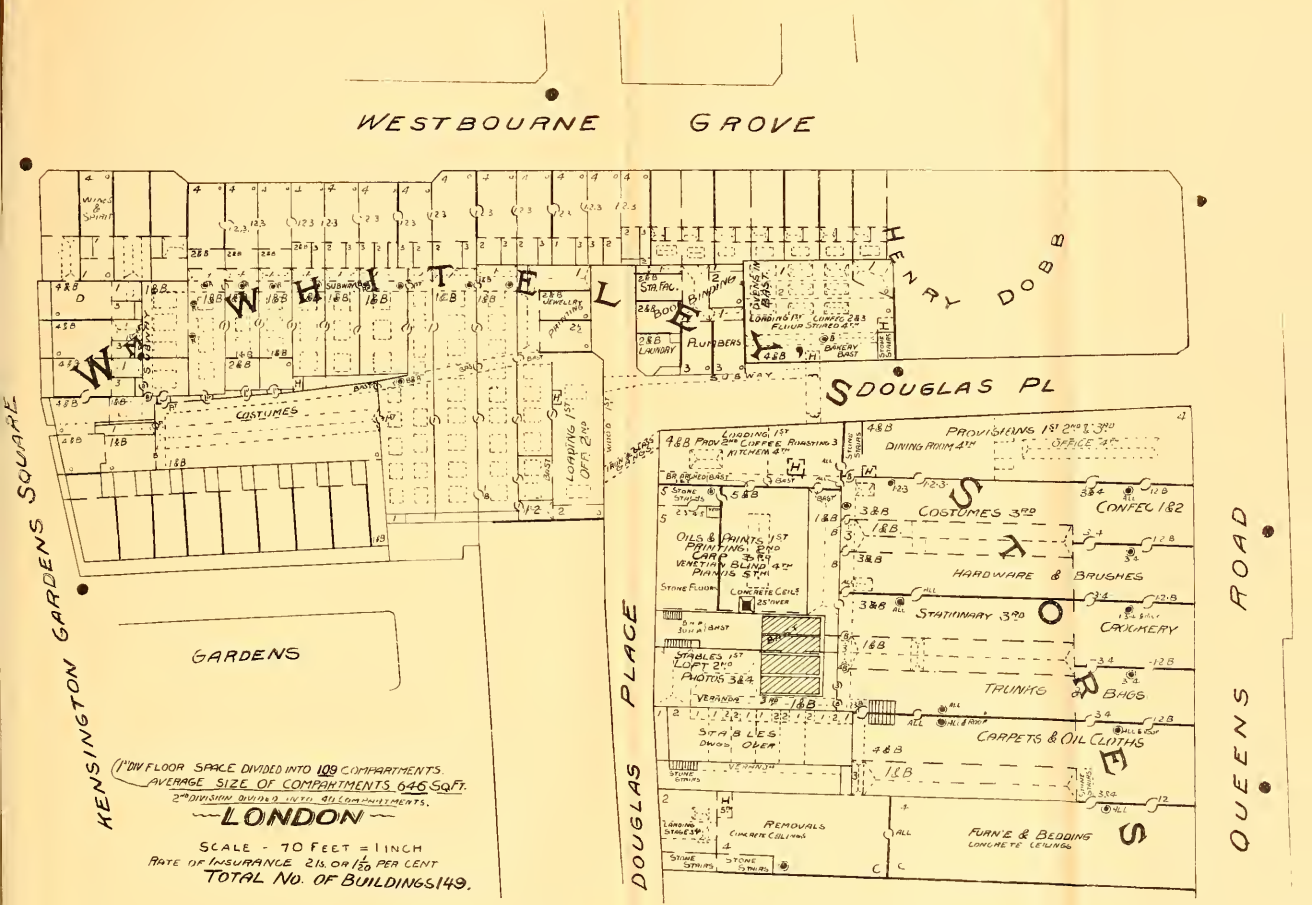
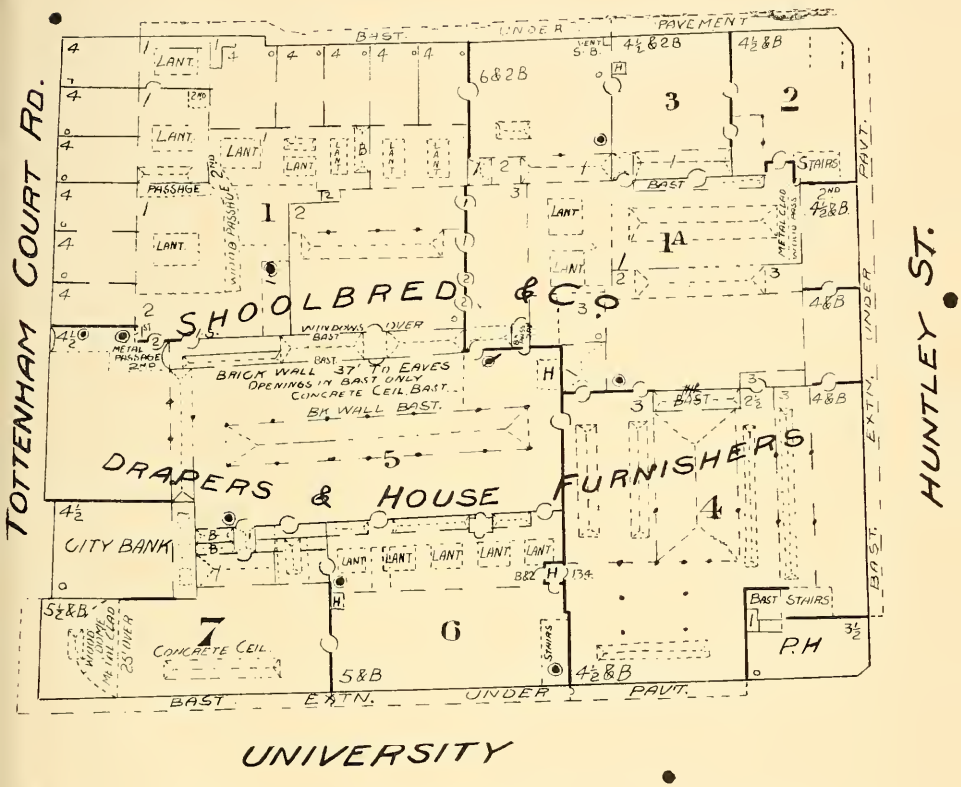

WESTBOURNE GROVE
WHITTELL
HENRY DOBB
DOUGLAS PL
KENSINGTON GARDENS SQUARE
GARDENS
DOUGLAS PLACE
QUEENS ROAD
STORES
COSTUMES
PROVISIONS 1ST 2ND & 3RD
COSTUMES 3RD
CONFEC 1&2
HARDWARE & BRUSHES
STATIONARY 3RD
CROCKERY
TRUNKS & BAGS
CARPETS & OIL CLOTHS
REMOVALS
FURN'E & BEDDING
OILS & PAINTS 1ST
STABLES 1ST
LOFT 2ND
PHOTOS 3&4
1ST DIV FLOOR SPACE DIVIDED INTO 109 COMPARTMENTS.
AVERAGE SIZE OF COMPARTMENTS 646 SQ.FT.
2ND DIVISION DIVIDED INTO 211 COMPARTMENTS.
LONDON
SCALE - 70 FEET = 1 INCH
RATE OF INSURANCE 2/6 OR 1/20 PER CENT
TOTAL NO. OF BUILDINGS 149.

Plate No. 7.

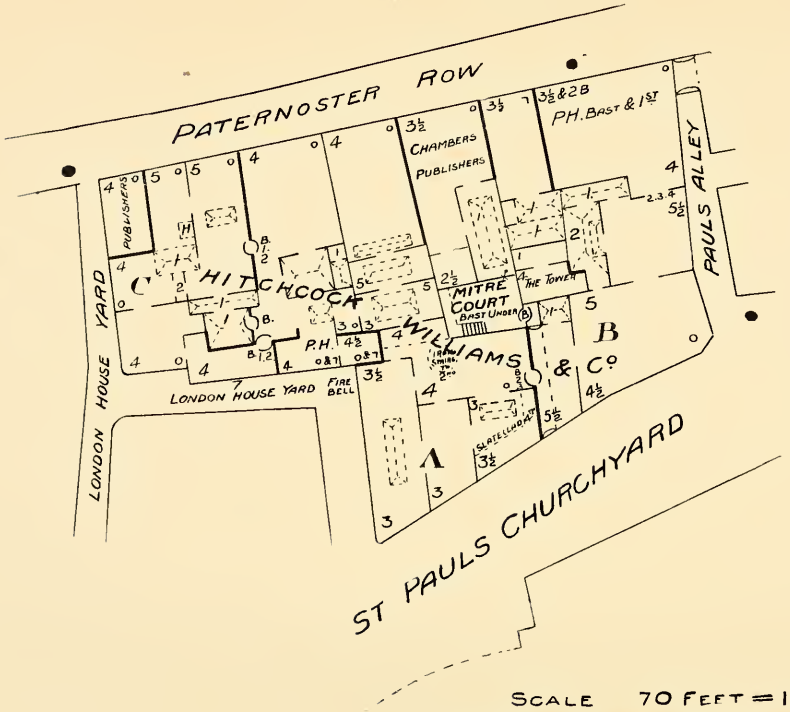


SCALE 70 FEET = 1 INCH.
FLOOR SPACE DIVIDED INTO 56 COMPARTMENTS.
AVERAGE SIZE OF COMPARTMENTS 1287½ SQ. FT.

LONDON

RATE OF INSURANCE 13s. OR $\frac{13}{20}$ OF 1 PER CENT.

Plate No. 8.



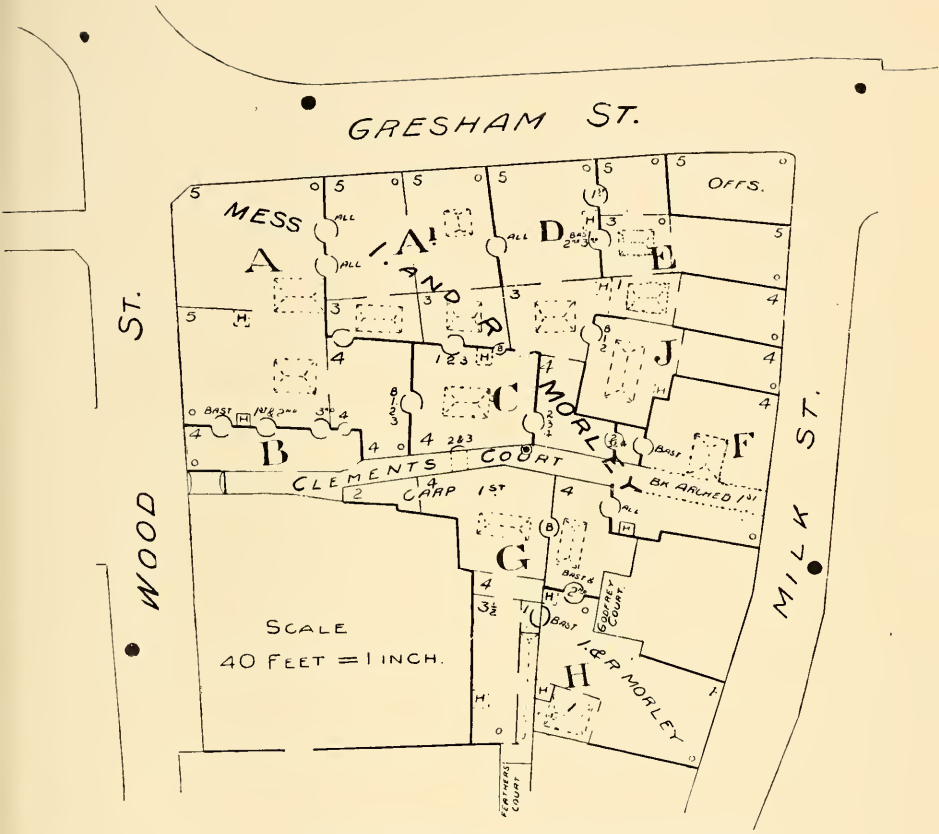
SCALE 70 FEET = 1 INCH

FLOOR SPACE DIVIDED INTO 30 COMPARTMENTS.
AVERAGE SIZE OF COMPARTMENTS 800 SQ. FT.

"LONDON"

RATE OF INSURANCE 11s. OR $\frac{11}{20}$ OF 1 PER CENT.

Plate No. 9.



FLOOR SPACE DIVIDED INTO 28 COMPARTMENTS
AVERAGE SIZE OF COMPARTMENTS 1243 SQ. FT.

-LONDON-

SCALE 70 FEET = 1 INCH
RATE OF INSURANCE 9s OR $\frac{9}{20}$ OF 1 PER CENT.

Plate No. 10.

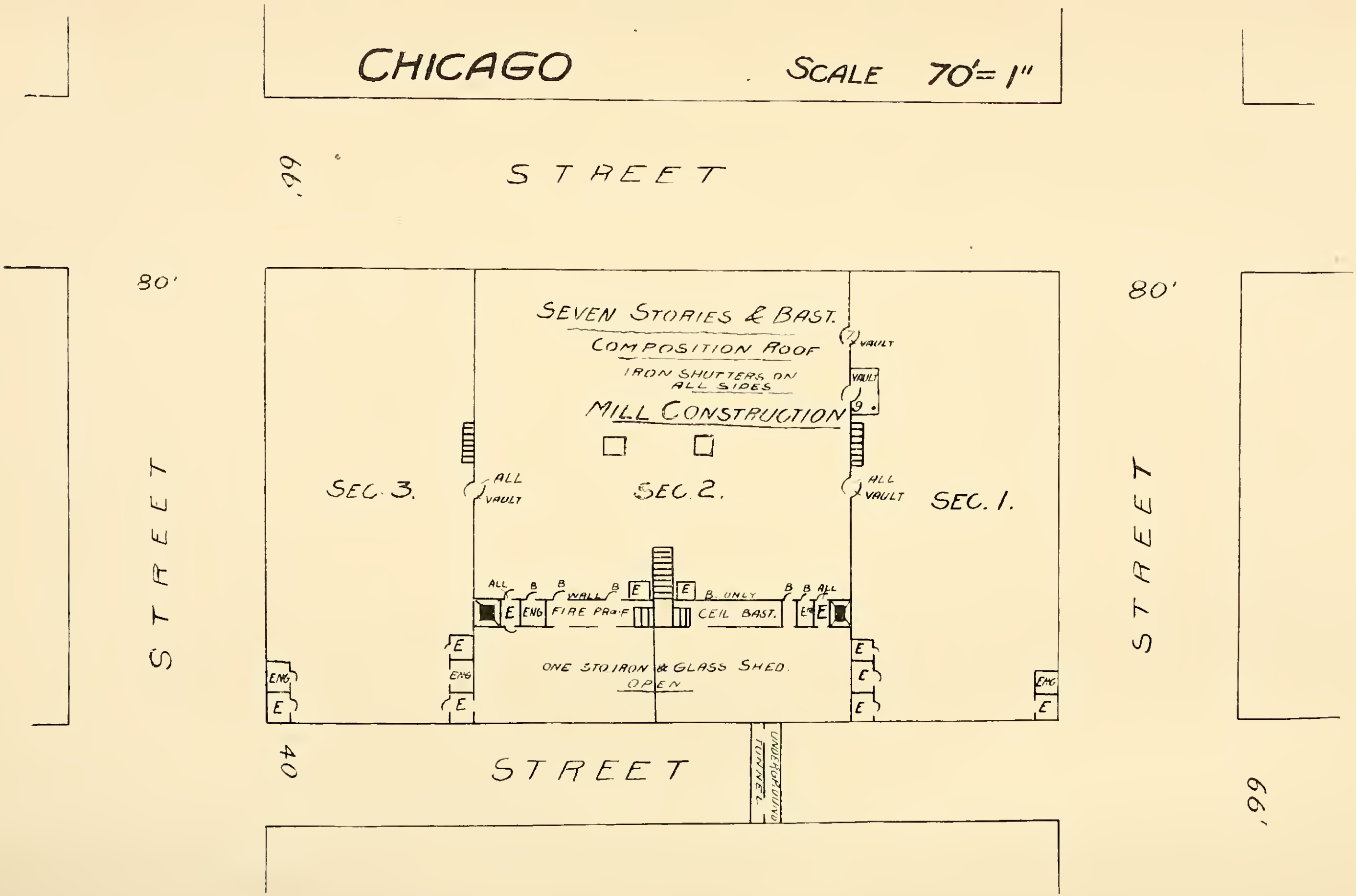

CHICAGO
SCALE 70'=1"
STREET
66'
80'
80'
STREET
STREET
SEVEN STORIES & BAST.
COMPOSITION ROOF
IRON SHUTTERS ON ALL SIDES
MILL CONSTRUCTION
SEC. 3.
SEC. 2.
SEC. 1.
ALL VAULT
ALL VAULT
VAULT
FIRE PROOF
CEIL BAST.
B. ONLY
ONE STO IRON & GLASS SHED.
OPEN
STREET
40
66'
UNDERGROUND TUNNEL

Plate No. 11.

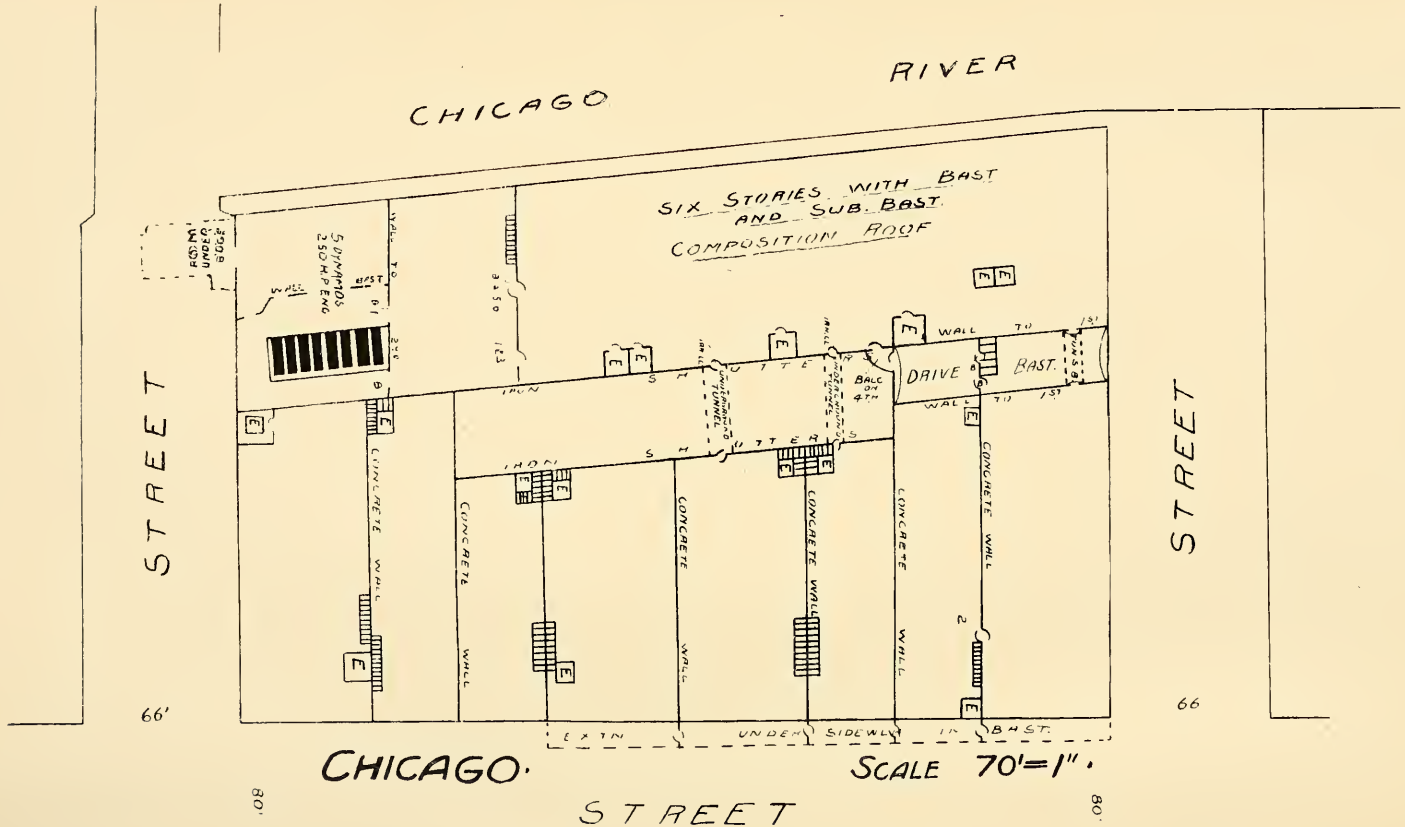

CHICAGO RIVER
SIX STORIES WITH BAST AND SUB. BAST
COMPOSITION ROOF
STREET
STREET
DRIVE
BAST.
CONCRETE WALL
CHICAGO
SCALE 70'=1".
STREET
66'
66
80'
80'

Plate No. 12.

feet high, or even less. Here I found concrete ceilings in many parts, slate and metal roofs, thick brick walls with double fire doors protecting the openings, and a well-constructed building. The total area which the external walls of the building enclose is 72,000 square feet. The number of buildings into which this area is divided is 56. (See Plate No. 8.)

The buildings of Hitchcock, Williams, & Co., facing on Paternoster row, Paul's alley, and St. Paul's churchyard, are situated in a section where some disastrous fires have occurred. The total area of the buildings is 24,000 square feet. This area is divided into 30 buildings. The height runs from 3½ stories to 4, and in a few cases 5. The same good construction and the use of thick brick partition walls is to be found here. In fact, you find it everywhere in London. (See Plate No. 9.)

Messrs. I. & R. Morley, situated on Gresham street, Mill street, and Wood street, is divided into twenty-eight different buildings. The total area within the external walls is 35,100 square feet. The number of buildings into which this area is divided is twenty-eight; average area of subdivisions, 1,243 square feet. (See Plate No. 10.)

My reasons for referring to these buildings are: first, to give an idea of their excellent construction; next, to show the common-sense methods which characterize the business men of London in isolating the dangerous portions of their business, and in the use of brick partition walls, which is the greatest safeguard for the prevention of the spread of fire.

Again, I desire to contrast the easy task which the London buildings present to the English fireman with the problem which faces the American fireman from poorly constructed, large-area buildings.

To illustrate, and for comparison, I submit the following plans of American buildings:

No. 11 represents a seven-story and basement, composition roof, iron shutters, mill construction, well-built building in Chicago. The fact that it is divided into four parts and is surrounded by broad thoroughfares, and its general good construction, makes it a very excellent fire-risk.

No. 12 represents a second square or building in Chicago. It is divided into eleven different buildings, separated in the most part one from the other. It has the same good points that mark the first building. In addition to the excellent construction and the broad streets upon which the buildings face, which are marked characteristics in Chicago, the law regarding the erection of standpipes is to be commended. Buildings of a certain number of stories and over a certain floor area are required to have permanently fixed on the out-

side pipes of the requisite diameter with connections at each story, and iron ladders with balconies. It places the Chicago Fire Department in such a position that when they arrive at a fire they have, by means of this law, water-towers all ready for use and ladders fixed in position with which they can reach the top of any building. The good point of this permanent pipe, with its connections for hose, is the fact that it means no extra expense for water to owners or occupants. The engines make connections from the bottom and supply the water from the public mains.

Nos. 13 and 14 are representative buildings in New York City. The widths of the streets on plan No. 13 are 100, 75, and 60 feet respectively. The building in question is large, situated on a corner and divided into three parts with double iron doors, which help wonderfully to protect from the extension of fire. The general construction is good; the height, 7 stories in two of the parts and 8 stories in the third division.

No. 14 represents one business facing on two streets of 100 feet in width and one of 60. It varies in stories from one to five, as shown by the marginal figures. One portion divided from the main building by brick walls is 9 stories high. General construction fair.

The New York and Chicago buildings represent the business of one firm.

Plans Nos. 15 and 16 take in squares of property in Boston and represent the business of different firms; yet in single instances they show larger unbroken areas and that lack of division brick walls which characterize Plans 11, 12, 13, and 14. The narrowness of the streets with us is remarkable.

In No. 15 the numbers round the edge designate the stories. The large floor areas which characterize some of the buildings are extremely noticeable.

Plan No. 16 takes in a little more than one block or square, and has all the points that handicap a fire department that you find in plan No. 15.

The scale of all these plans being drawn 70 feet to the inch, it is comparatively easy, by actual measurement, to estimate the areas of the respective buildings; and it does not require any expert knowledge to see the advantages of one city over the other.

The following table gives the largest areas of the buildings in the plans submitted:

Large area building in London plan .	None.
Largest area building in New York plan (unbroken by partition) . . .	22,800 sq. feet.

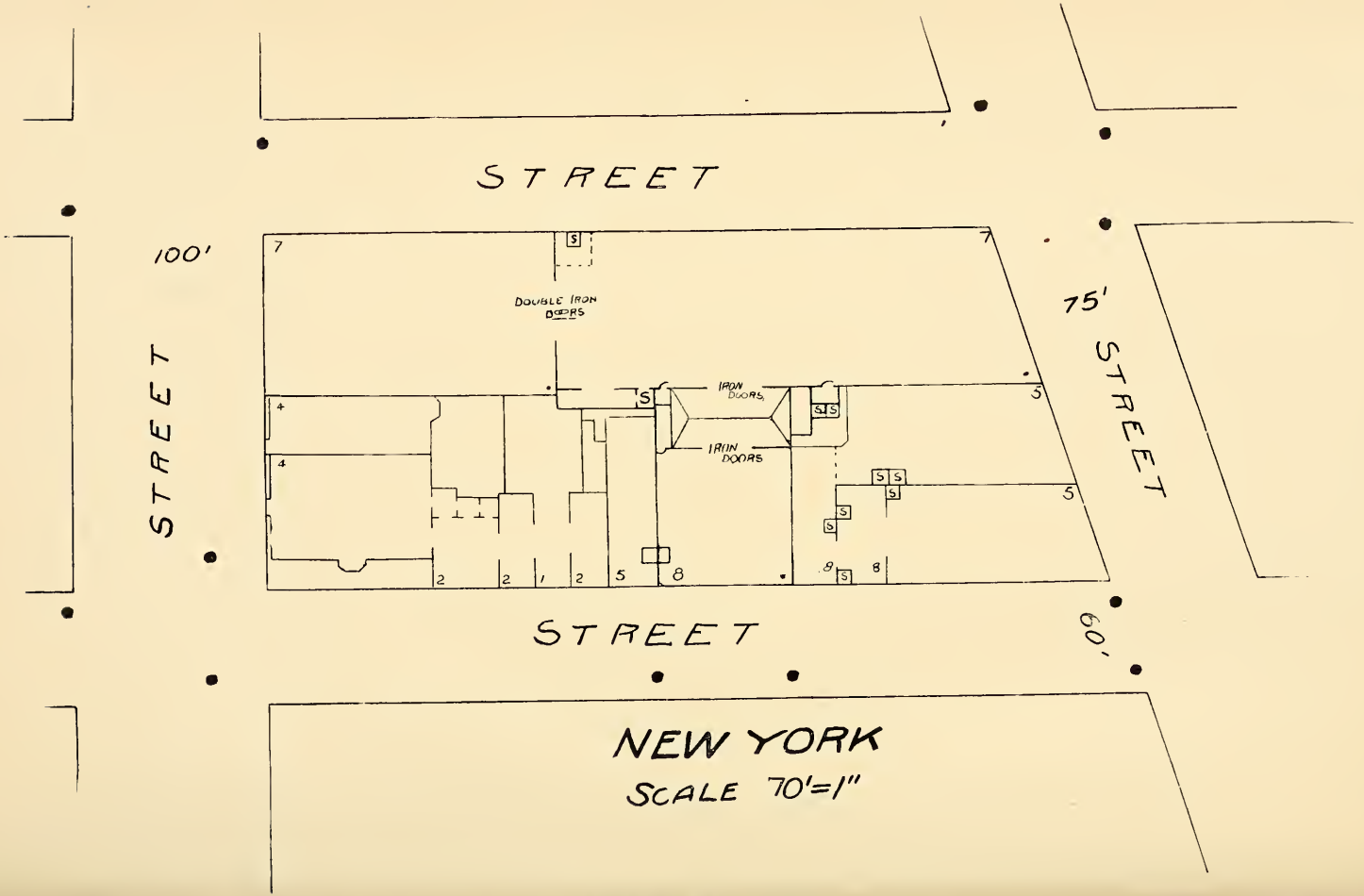

STREET
100'
STREET
DOUBLE IRON DOORS
IRON DOORS
IRON DOORS
75'
STREET
STREET
60'
NEW YORK
SCALE 70'=1"

Plate No. 13.

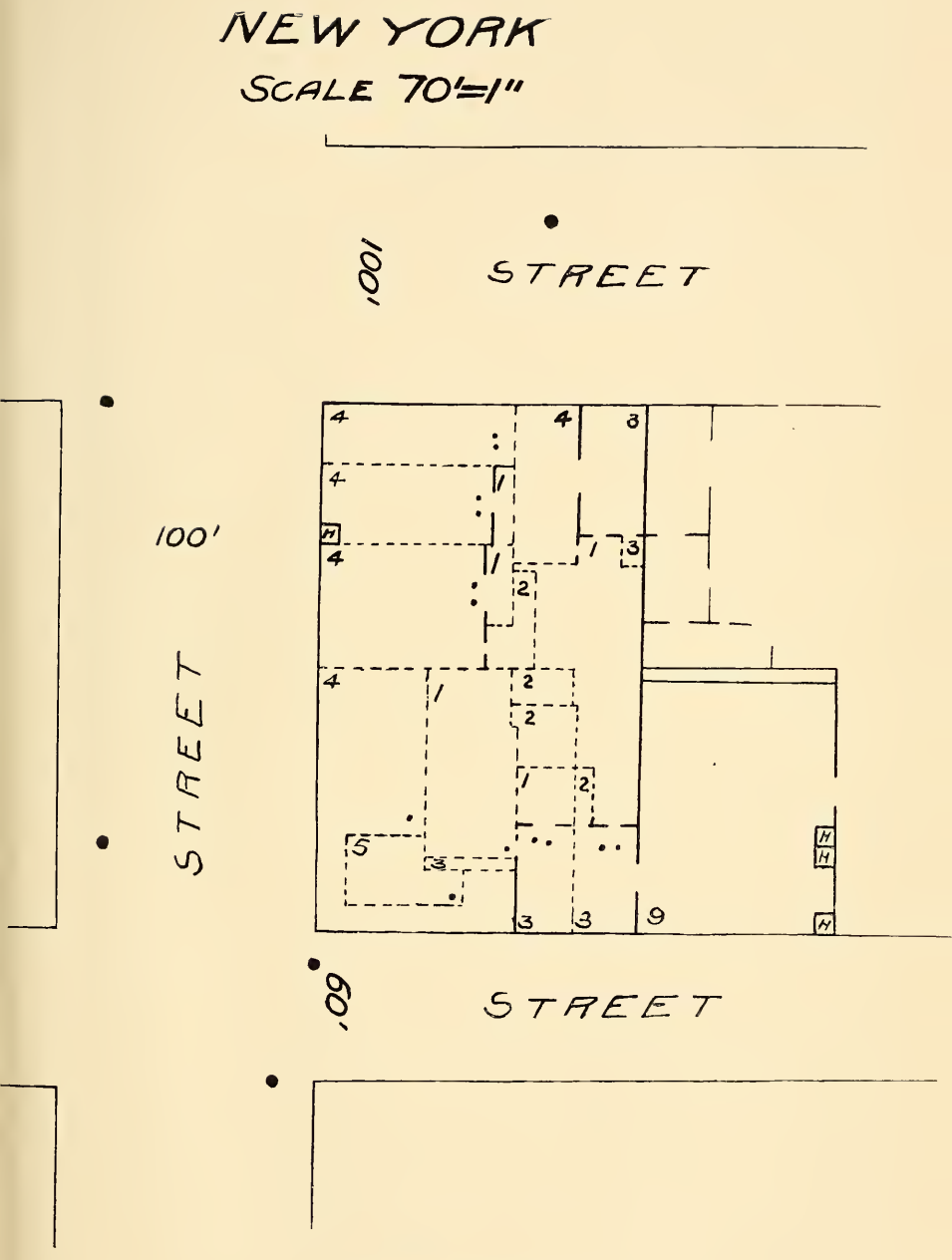


Plate No. 14.

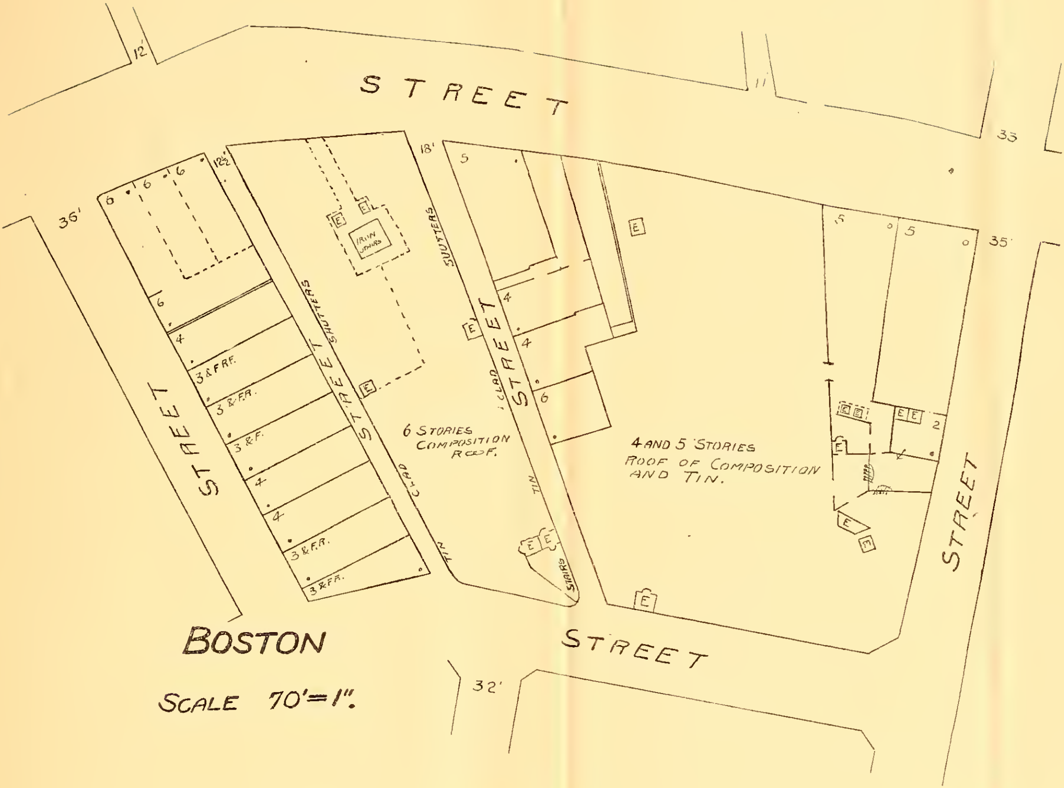

STREET
STREET
STREET
STREET
STREET
STREET
12'
11
33
36'
12½
18'
35'
32'
SHUTTERS
SHUTTERS
CLAD
CLAD
TIN
TIN
STAIRS
3 & F.R.
6 STORIES
COMPOSITION
ROOF.
4 AND 5 STORIES
ROOF OF COMPOSITION
AND TIN.
BOSTON
SCALE 70'=1".

Plate No. 16.

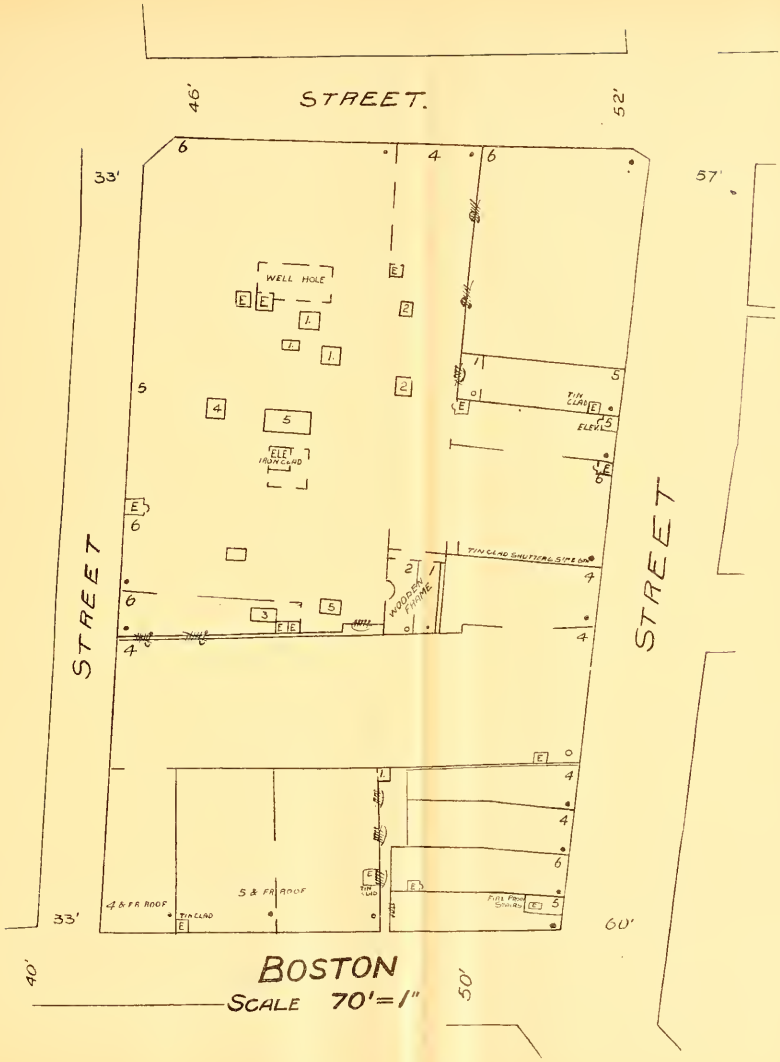

STREET.
46'
52'
33'
57'
WELL HOLE
TIN CLAD
ELEV.
IRON CLAD
TIN CLAD SHUTTERS & SIMPSON
WOODEN PRIME
STREET
STREET
4 & FR ROOF
TIN CLAD
S & FR ROOF
TIN CLAD
TILL FOR SHAFTS
33'
60'
40'
50'
BOSTON
SCALE 70'=1"

Plate No. 15.

Largest area building in Chicago plan (unbroken by partition) . . .	24,300 sq. feet.
Largest area building in Boston plan (unbroken by partition) . . .	52,000 "

New York has buildings of larger area than those of which plans are submitted, but in many cases they are of fire-proof construction, and the same is true of Chicago.

The laws governing explosives, petroleum, etc., in London are very exhaustive, and contain points which I recommend to the Boston commission's consideration.

I gave some attention, as instructed by the Board, to the Metropolitan Buildings Act and the various laws governing buildings in London. I have also made a comparison between them and the New York and Boston building acts.

There are 550,000 to 600,000 buildings in London, none of which are of wood, and of this great number previous to 1890 there were only two or three that violate the law and exceed a greater dimension than 216,000 cubic feet, or an area of about 3,600 feet to a floor if there are three stories 60 × 60 × 20. One of these buildings is a large gas retort and one an electric-light company station, for the building of which special parliamentary sanction had to be obtained.

Fancy in Boston our being obliged to go to Washington in order to obtain permission to build a large-area building! The twenty-ninth section of the London County Council Act of 1890, which allows buildings used for one business of a non-inflammable nature (by special permission of the county council) to be built containing 450,000 cubic feet (this is a building of about 77 feet front by 77 feet deep by 77 feet high), has only permitted the erection of 15 warehouses. In other words, there are in London only three buildings, built by special permission of the English Parliament, larger than 216,000 cubic feet, and only 15 which reach the maximum of 450,000 feet. If under the London law a larger floor area than about 3,000 square feet is to be obtained, the building must be two stories or one story in height according to the area of the floor desired.

If our American cities were built on this plan, what a wonderful improvement there would be in our fire records!

London's advantage at present is that she has been reaping the benefit of excellent laws for years, while in New York and Boston they are in their infancy.

It would be well to look into the portions of the law which cover fire-escapes, theatres, protection of light wires used in electricity, of which Boston takes no notice, and the legal portion, especially that which refers to the court decisions.

The area of light wells is not allowed to go below 100 square feet in London, and must be built of fire-proof material. In Boston and New York they are not limited, and as a result we have reached a very poor state of things in this direction. Many of our so-called light wells are so small that they are like flues of a chimney.

The building laws of Boston at the present time resemble in many particular points those of London. They are to be commended in the main. Doubtless, during the next year or two, experience will show necessary changes that should be made, if it has not already done so, and our laws will be the perfect ones that a city of Boston's wealth and population demands.

New Fire-Alarm System in Paris.

Paris is divided into 24 districts. Each district has a central station equipped with the necessary fire apparatus and a number of men, some of whom are qualified to operate the electrical apparatus.

These central stations vary somewhat in the extent of their equipment, the more important of them being denominated "casernes," and the others "post centrals," the latter being located in the less important districts, and only having electrical connection with the fire-alarm boxes in their district and the caserne most convenient to them.

There is one central station, which is the headquarters of the entire system.

Each caserne is connected not only with its dependent post central station and some fire-boxes, but to the main central station. The system is operated by two methods. By the use of a double wire cable, connections are made between the several stations, and so arranged that when standing at rest a ground circuit is formed through a set of electro-magnetic apparatus located in the central stations, termed in this system the "Morse Special."

This apparatus is controlled by mechanical devices in the fire-alarm boxes, which are set in motion by the person giving the alarm. An inscription on the outside of each box says that he is simply to break the glass inserted in the centre of the door to ensure the desired result. The act of breaking the glass produces three results, viz.: The door is thrown open and a mechanical gong on the inside of it is set ringing in the same manner and for the same purpose as those of the keyless doors used in the Boston system. A bell in the central station is also set ringing, indicating to the men in charge that a call has been made for some box in their

district. The mechanism of the box is also started automatically, a part of which consists of a wheel somewhat like that in the old district box abandoned in Boston years ago.

The revolution of this wheel transmits to the central station a series of arbitrary signals, which are recorded on paper by a Morse register, and when translated by code, indicate the box from which they were sent. By a further action of the signal wheel the "Special Morse" circuit is opened, and a metallic circuit established through the telephones, which also form a part of the equipment of each fire-alarm box.

On the inside of each fire-alarm box are displayed further instructions to the senders of alarms, to the effect that they shall immediately communicate to the central station, by means of the telephone, the location and character of the fire or other cause for which the call was given. The boxes contain no receivers, consequently the person sending a message has no means of knowing whether he has been correctly understood. He is only informed by an inductive sound in his transmitter, made by the person at the central station, that a message has been received. In addition the central stations are equipped with a telephonic system, and are able to talk with any other central, or with the grand central, as occasion requires.

On the receipt of an alarm, the party receiving it at the central makes such a disposition of the apparatus as the size of the fire may require, by calling upon the posts de ville or apparatus houses within his district. If in his judgment there should be additional apparatus sent, he calls on the main central for further instructions. The whole matter of moving the apparatus is performed with the telephones, no use being made of the special Morse service except that of indicating the signal-box from which the call was sent. If, however, the telephone service should fail, they then use their Morse apparatus to transmit their messages between the central stations.

Notwithstanding the fact that their wires are so placed beneath the streets as to secure almost absolute safety to them (chiefly on account of the subways for sewers through which they pass being so admirably constructed, and because no high-tension currents from other service are being discharged into the earth, as in the city of Boston), they take every precaution to avert or correct any faults that might occasionally become manifest.

Their lines and stations are tested every day during the stormy periods of the winter season, and once a week at other times.

This system, as here described, appears to be well contrived, carefully constructed, and is, no doubt, successfully operated. While it is probably everything that a city like Paris requires, with its practically incombustible buildings and broad avenues, it is evident that the tinder-boxes of Boston would have little chance for safety should a fire in any of them be allowed to have its way while the apparatus was being instructed to proceed to the spot by any such elaborate process.

The system which we have inaugurated of having a telephone in connection with the fire-alarm boxes in Boston on special circuits, independent of those now in use, should be extended, and the idea of using telephones for sending in alarms of fire after the box has been operated should be thoroughly investigated. To have telephones in all boxes would be at least a useful auxiliary to the present Morse key, and it seems to me as if it could be made as reliable, if not more so. It would serve one purpose, that of minimizing the danger of losing an alarm when more than one box is pulled at the same time for the same fire.

The idea which is embodied in the Paris service of automatically sending in an alarm by the mere breaking of the glass should be adopted in the American fire-alarm box. Considerable time would be saved over the present system, which necessitates opening the box and then pulling down the hook before an alarm is sent.

The time has come for using a telephonic system as an auxiliary, or even more than an auxiliary, to the present system in use in American fire-alarm departments. It is true that we use it in our covering system between our various houses, but we should go one step further and see if there is not an advantage to be gained from embodying it in our public fire-alarm system.

All the above statements I have endeavored personally to verify. The plans of the fires and of the buildings in London are verified by competent men. The information regarding London insurance has been obtained from managers in the business of high standing. I have every reason to believe that it is reliable. London is a great centre for the insurance business, not only of England, but of other countries. The methods of carrying it on are admirable, and the desire on the part of the managers appears to be to obtain a fair profit on their investments.

In Boston our heaviest losses — and we are no exception to the rule — have been from dangerous fire-risks, well known to insurance and fire men. It will be years before we will reap the benefit of good building laws. In the

mean time, buildings of bad construction, which have been built in years past, should be specially marked, and everything done to minimize the danger from them in case of fire. They should be patrolled, together with the dangerous sections of the city.

The plan of the Board to strengthen the service, both in water-supply and apparatus, in the heart of the city should be carried out, and the suburbs of the city receive just what they require at the present time, and not what their possible needs will demand some years from now.

The plan of fixed pipes with water connections, and iron ladders and balconies on dangerous buildings, should be considered, and, if found advisable, their adoption compelled by law.

Wires running near dangerous risks should be put underground, or where that cannot be done, run over the tops of the buildings.

Coöperation on the part of our citizens with the authorities to bring about the same favorable conditions as exist in other great cities will aid materially to reduce the fire-risks of Boston.

Respectfully,

John R. Murphy.