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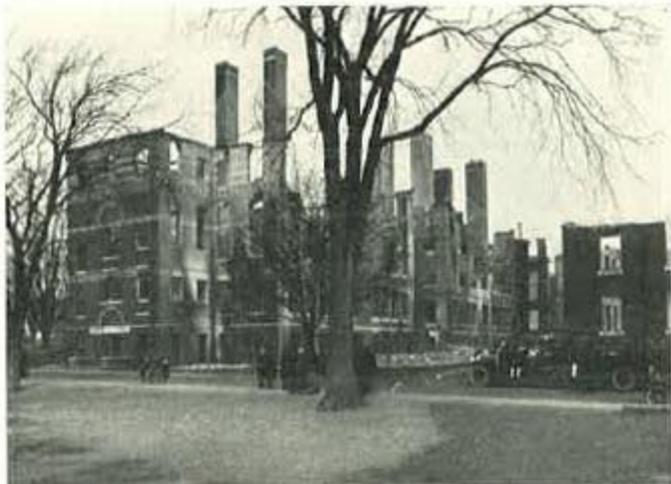
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Destruction of State Normal School, Bridgewater, Mass.

THE State Normal School at Bridgewater, Mass., was the first to be established in this country. It had been much enlarged in recent years and the layout of the buildings at the time of the fire is shown on the sketch on page 2. It was owned and carried on by the State.



Looking Northeast from Grove Street
Main Building on left. Tillinghast Hall on right.

The Main Building, erected in 1890-1895, was of brick, three stories, with basement and attic, of the common schoolhouse construction, with joisted wooden floors, plaster finish on wood laths, and contained a large hall, classrooms, and a laboratory. Tillinghast Hall, built 1896, of brick, two stories, with basement and attic, was of similar construction with a large wooden cornice, and was used as a dormitory. Old Woodward Hall, built 1887, was of wood, two stories in height, with basement and attic, and also occupied as a dormitory. All three buildings had large open spaces in the roofs and no effective fire cutoffs or fire stops. Open stairways predominated.

Each building was equipped with 1-quart carbon tetrachloride extinguishers, 2½-gallon chemical ex-

tinguishers, and small hose supplied by 3-inch standpipes. Water was furnished by four 5000-gallon tanks on the roof of the Main Building, and by a 1000-gallon Underwriter fire pump in the Power House, taking suction from the small pond with an estimated capacity of 250,000 to 300,000 gallons. A pipe system (5-inch or possibly 6-inch), as shown on the sketch, carried the water from the tanks and pump to three hydrants and to the standpipes. Constant pressure was maintained by means of a small auxiliary pump controlled by an automatic governor. There were two automatic sprinklers, one in each of the two dust chutes in the Main Building, supplied from the 3-inch standpipes. There was no connection between this private system and the public water mains.



Looking Northwest from Summer Street
Ruins of Old Woodward Hall in foreground. Ruins of Main Building in rear. Dormitory on right.

The town water system was owned by a private company. The static pressure at the Normal School was about 75 pounds. The hydrants are infrequent and the pipe sizes are very small, mostly 4-inch. Therefore only two fair fire streams could be furnished at the school. There were three small cisterns

within 1000 feet. The public fire department has one 500-gallon Maxim pumper.

The Fire

At 4:45 A.M. on December 10, 1924, the night watchman discovered fire behind the ceiling of the old gymnasium, on the basement floor of the Main Building, about in the middle. He gave the alarm immediately on the steam whistle of the school, at the same time sending one of the boiler tenders to pull the public fire-alarm box just outside the Boiler House. The chief engineer of the school, living nearby, aroused by the whistle, started immediately for the building, bringing along a small truck kept on the premises and carrying fire hose, ladder, rope, and similar equipment. The chief engineer and the watchman broke through the ceiling and fought the fire with small hose from the standpipes.

Above the ceiling was a concealed space so large that a person could walk in it, and through it ran large metal heating and ventilating ducts and some electric circuits in iron conduits. The fire seemed to be directly on top of one of the ducts where there was considerable refuse, in which the fire burned fiercely. As the

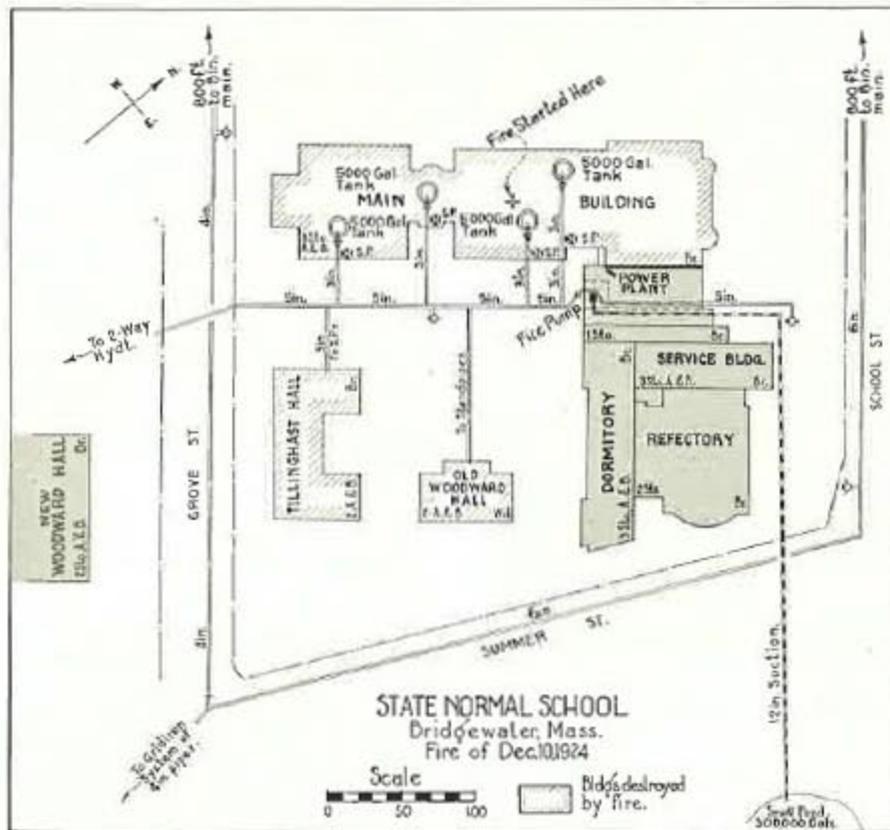
fire was very difficult to reach with hose streams, it soon spread out of control, and breaking through into the open stairway went quickly to the roof, so that in a short time a considerable part of the building was a seething mass of flames.

The Underwriter pump was started at once, and furnished two good streams. The public fire department responded promptly and laid two lines from their engine. The chief of the Public Department, realizing quickly the seriousness of the fire, immediately called on surrounding towns for help. West Bridgewater sent a 350-gallon Maxim engine, Middleboro a 500-gallon Maxim engine, and

Brockton a 1000-gallon Seagrave engine. These were all automobile motor pumpers.

The Brockton pumper furnished one stream throughout the fire, taking all the water available in the mains and forcing the Bridgewater pumper to move to a cistern in the City Square. The Middleboro and West Bridgewater pumpers took suction from the small pond, and each gave one stream. This pond furnished an ample supply for these engines and for the Underwriter pump, and was not exhausted at the end of the fire. The Underwriter pump ran for several hours until the men in the boiler room were forced to draw the fires and get out of the building to save their lives, the falling walls of the Main Building making two big holes in the Boiler House roof.

The six or seven streams available could make but little impression on the large building now on fire throughout. There was a fairly stiff wind from the southwest, and special effort was made to keep the fire out of the power plant and the important buildings east of it, and this succeeded. The wooden cornice of Tillinghast Hall took fire, which quickly spread into the hollow roof, until soon this building also was be-



beyond saving. The fire continued on to Old Woodward Hall, which was destroyed. The occupants of these buildings, however, had time to remove most of their belongings.

The immediate cause of the fire is merely conjecture, but it is probable that rats and mice were responsible for it. The students were accustomed to eat their lunches in the room adjoining the gymnasium and there was always more or less of the left-over lunches about, so that the building was infested with rats and mice. The heating ducts at this time of the year kept the concealed space warm and made it a good place for rodents. Matches

may have been taken in and ignited either by the heat or by the possible gnawing of the rats, or ordinary spontaneous combustion may have occurred.

The primary cause of the heavy loss was the inaccessible hollow space above the basement ceiling with everything dried to a tinder by the heating ducts, and connecting into similar concealed hollows in walls and floors, and with an open stairway near so that there was nothing to prevent the very rapid spread of the fire to the top of the building and then quickly throughout the length of it. The public water supply was woefully inadequate, but with these fatal defects in construction the building probably could not have been saved under any conditions unless equipped throughout with automatic sprinklers backed by an ample supply of water.

If there had been a large water supply available, with firemen enough to handle it effectively, Tillinghast Hall and Old Woodward Hall could probably have been saved. The great loss was, therefore, due principally to the bad construction of the Main Building. The loss of Tillinghast and Old Woodward Halls was due to the scant water supply. The saving of the buildings to the east was a piece of good fire fighting. It is not clear why the Underwriter pump was not run at much over one-half its capacity.

It is interesting to note that the fire so aroused the town of Bridgewater that they have recently overcome long-standing difficulties and voted to purchase the water system. They now propose to provide a standpipe of 1,000,000 gallons capacity,

to enlarge the pumping equipment, and to replace the present small pipes with 8-, 10-, and 12-inch mains so as to provide an ample water supply at all points.

The loss caused by this fire is approximately \$900,000, borne directly by the State of Massachusetts, no insurance being carried on such property.

The lessons from this and similar fires may be summarized briefly:

1. *All new buildings should be of distinctly better construction, preferably fireproof throughout, but in any case, without considerable concealed spaces, and with such as may be unavoidable provided with frequent fire stops. Stairs and other vertical openings should be in fireproof towers with reliable fire doors at each story.*

2. *Even with an incombustible building, automatic sprinklers are very desirable in basements, storage rooms, work rooms, main halls, and any other places where the occupancy contains much burnable material.*

3. *For existing buildings of this general type, considerable improvement can be made by providing such fire stops as are possible, cutting off stairways and similar vertical openings at each story, and then providing automatic sprinklers practically throughout.*

4. *Large buildings should be subdivided by reliable fire walls. Such an important building as the Power Plant should be so located or cut off as to be absolutely free from danger in case of fire in the main buildings.*

5. *In all buildings there should be a good supply of fire pails, soda-acid extinguishers, and small hose.*

Spray Booth Fire Causes Large Loss

THE Unit Construction Company of Philadelphia are manufacturers of wooden radio cabinets, to which a finish coat of "Duco" celluloid-lacquer is applied by means of an air spray, in booths located in the third story of the main building. The booths were of metal, 8 feet wide, 7 feet high, and 7 feet deep, open at the front, similar to the one shown in the cut on page 4, although somewhat larger.

Soon after the noon hour on February 24, while the spraying process was stopped due to trouble with the exhaust fan, white vapors were seen arising from the floor inside one of the booths. Pails of sand were immediately applied, and the fire was apparently extinguished. Then suddenly the whole interior of the booth was ablaze, the flames bursting forth into the room and singeing the hair of one of the men. He escaped only by dropping on his hands

and knees and crawling to the door. This flare from the booth was due to the deposit of celluloid-lacquer which had accumulated to a thickness of $\frac{3}{4}$ inch on the walls and one inch on the floor, and which, like all celluloid when decomposing, gives off two hundred times its own volume of inflammable gases.

There were no sprinklers in the booth to check the fire, and in the few seconds before the sprinklers in the main room operated, the fire ignited newly finished cabinets nearby and spread to adjoining spray booths. These in turn poured out more burning gases, adding still further to the fire, which now gave off such intense heat that cabinets in the opposite end of the room were blistered and all of the 192 sprinklers in this area opened.

The employees quickly brought in two hose lines through the windows; and the fire department, which had been summoned, had three or four ad-