

to the former system be found advisable, as seems probable. Sir John Hutton, chairman of the Works Department, expresses the opinion that the workmen may not be disposed to do as good work for the Council as for a contractor. It will be remembered that not long ago the City Council of Toronto tried the same experiment, and with the same result. In both cases, the desire to curry favor with the trades unions seems to have been the actuating motive.

A RECENT and instructive experience with a steam heating plant is reported in connection with one of the Toronto public school buildings. Last summer the Bolton avenue school, a two-storey building, was enlarged to contain sixteen class rooms, instead of twelve. This was done by adding a third storey, making an increase of fifty per cent. in the space to be heated. The apparatus formerly consisted of one boiler and plain coils of steam pipes—the usual pressure of steam running at six to eight pounds gauge—and all worked well. For the new storey the old mains and returns were enlarged where necessary, and new extensions put in, with cast iron radiators. With the advent of cold weather it was found impossible to make the apparatus do its work, as the water backed out of the boiler into the returns before sufficient pressure could be obtained to make a circulation. Up to this time there had never been a check valve on the return connection with the boiler, and Mr. Bishop, Superintendent of Buildings and architect for the School Board, was of the opinion that to provide one would overcome the difficulty. The contractor for alterations to the plant and others having extended experience with steam apparatus differed from him, thinking this would have no appreciable effect and that another boiler of the same capacity as the one in use would be found necessary. The check valve was put in at a cost of about twenty-five dollars, and the system worked as perfectly as ever, satisfactorily warming the whole building even during the extremely cold weather which prevailed at times during the past winter. The amount of fuel consumed is about fifteen per cent. more than formerly, with a corresponding increase in the steam pressure required. An additional boiler would have cost nearly one thousand dollars, with an annual cost of at least one hundred dollars more for fuel than the present arrangement. In the building referred to there are 268,000 cubic feet of space with 2,200 sq. feet of window glass. The heating is entirely by direct radiation and the boiler heating surface is one-tenth the radiating surface, a proportion allowed for ordinary buildings by Baldwin, the eminent authority on steam heating. These facts show a rather wide difference of opinion among people who ought to know the requirements, and that the subject of apparatus for heating or ventilating is one with which architects should be thoroughly familiar.

BUILDING CONSTRUCTION IN ITS RELATION TO FIRE PROTECTION.

THE large fire which caused such destruction to buildings in one of the principal parts of Toronto last month, made reasonably clear that the series of conflagrations by which Toronto has been visited of late were due to incendiarism. It can hardly be conceived in the light of the immunity which the city enjoyed for so many years, that three such conflagrations should take place within so short a period from accidental causes. It has been the subject of comment that in each instance the fires originated in buildings situated in the very heart of the business district of the city, where there was a reasonable certainty of their being rebuilt. It is to be hoped that the reward of \$1,000 offered by the Underwriters' Association for the conviction of the incendiaries will have the desired result.

The rapid destruction of Mr. Robert Simpson's new departmental store building, an illustration of which appeared in the January number of the CANADIAN ARCHITECT AND BUILDER, and which was among the first of the buildings erected on the modern iron construction principle, not only demonstrated the insufficiency of the city's fire equipment, but what is more important, the fact, that so long as the prevailing methods of building are allowed to continue, the most effective fire extinguishing appliances will be of little avail in preventing the spread of fire when once it shall have obtained hold upon a building. If a merchant wants a building put up with the greatest amount of floor space and with street fronts almost entirely of plate glass, his architect may advise him of the danger to which

it will be exposed from fire, and that it will also be a menace to the safety of surrounding buildings, but if the proprietor refuse to go to the expense of making the building fire-proof and be willing to assume the risk of having it destroyed, the architect can do no other than carry out his wishes. It is here that the law should step in and prevent the erection of structures of such a character. Since the recent fire, a clause has been discovered in the existing building by-law of the city, limiting the floor areas of buildings and providing other safeguards against fire. Strange to say, this clause has been more honoured in the breach than in the observance. It reads as follows :

"No block of warehouses or storehouses or other buildings (except churches, public halls and opera houses) shall contain more than forty squares of building on the ground floor thereof, including internal and external and half the party walls belonging thereto, unless such building be separated and divided by party walls into divisions of not more than forty squares of building as aforesaid, unless the permission of the City Council shall be first obtained. No block of warehouse or other buildings shall communicate with any other block of warehouses or other buildings through a party wall, nor shall any stable communicate with any other stable through a party wall, unless the door case and sill of every such communication be of stone or wood covered with tin, and unless there be to every such communication a door of two thicknesses of wood covered on both sides with tin. No timber bond or lintel shall be laid into the brick work of any wall in any such building nearer than eighteen inches to the opening of such communication, unless the door case and sill of every such communication be of stone or of wood cased with tin."

The committee, consisting of Messrs. H. B. Gordon, W. L. Symons, W. R. Gregg, Edmund Burke, D. B. Dick, B. Jarvis, J. A. Pearson, Mark Hall, E. J. Lennox and Geo. Miller, appointed by the Ontario Association of Architects to recommend to the City Council needed amendments to the city building by-law, have lost no time in dealing with the subject. Since their appointment the committee have held eight meetings, at which the building ordinances of London, Eng., New York, Chicago, St. Louis and a number of other cities, have been carefully considered, together with other data bearing on the subject in hand. As the result of their deliberations the committee have framed a by-law which will be recommended to the City Council at an early date. In view, however, of the unusual circumstances at present prevailing in the city, and the urgent necessity for immediate legislation to prevent the erection of buildings constructed in a manner similar to those recently destroyed, the committee have recommended that the following provisions be at once incorporated into the existing by-law :

FIRE-PROOF BUILDINGS.—Every building hereafter erected, which belongs to the public building class or the hotel class, the highest occupied floor of which exceeds 50 feet in height from the average ground line; and every building hereafter erected belonging to any other class, the highest occupied floor of which exceeds 70 feet in height from the average ground line, shall be built fire-proof; that is to say :

It shall be constructed with walls of brick, stone or terra-cotta, or other hard, incombustible materials. No wooden beams, lintels, bond timber or wood strips shall be built in walls.

The floors and roofs shall be constructed of brick or terra-cotta arches or other hard, incombustible material, and the supporting beams shall be of steel or iron, all properly cased with non-combustible material.

The stairs and staircase landings shall be built of hard, incombustible materials.

No woodwork or other inflammable material shall be used, excepting the floor boards, the doors and windows and their frames, and the trims, casings and interior finish, when filled solid at the back with fire-proof material. The exposed parts of all constructional steel and iron work, supporting walls, floors, roof or stairs, shall be efficiently protected with at least 2 inches of porous terra-cotta; or, where such is not feasible, with wire lath and plastering of sufficient thickness.

No existing non-fire-proof building shall be converted to the purposes of a building of the public building or hotel classes, the highest occupied floor of which exceeds 50 feet from the average ground line, and no existing non-fireproof building shall be increased in height to exceed the limits set forth in this section for new buildings of the same class.

But nothing in this section shall prevent the erection of what are known as grain elevators as usually constructed, provided they are erected on the water front in isolated localities, and under such conditions as the Inspector of Buildings may deem prudent.

ELEVATORS.—Where elevators are enclosed in shafts, all the enclosing walls must be built of brick or terra-cotta or other incombustible material.

In all buildings of the manufactory class that are more than 2 stories in height above basement, and in all buildings of the store and warehouse class that are more than 3 stories in height above basement, the elevators must be enclosed in shafts built of brick or terra-cotta, and extending at least 3 feet above roof, and covered with a light glass sky light or easily broken covering; and all the doorways opening into such shafts shall be closed by iron doors, or else by doors of two thicknesses of solid boards covered all over with asbestos and sheet metal.

Where elevator shafts cannot conveniently run to top story and from thence out to roof, the top of shaft must be covered with a fire-proof ceiling.

Where elevators are open, the guide posts and corner posts must be of iron, and any enclosing screens must be of incombustible material. No woodwork of any kind, other than strips on cage guide posts, shall be carried from floor to floor.

FLOOR AREA.—No building hereafter erected (except public audience rooms) shall have on any floor thereof more than 4,000 square feet of floor area undivided by division walls. Nor shall the undivided floor area of any floor in any existing building (except public audience rooms) be increased so as to contain more than 4,000 square feet.

Division walls to divide the floor area of a building into spaces of not more than 4,000 square feet must be of stone, brick or terra-cotta.