



NRC Publications Archive Archives des publications du CNRC

The Fire Research Building, Division of Building Research, N.R.C.
Jutras, J. R.

For the publisher's version, please access the DOI link below./ Pour consulter la version de l'éditeur, utilisez le lien DOI ci-dessous.

Publisher's version / Version de l'éditeur:

<https://doi.org/10.4224/20358946>

Technical Note (National Research Council of Canada. Division of Building Research), 1958-09-01

NRC Publications Record / Notice d'Archives des publications de CNRC:

<https://nrc-publications.canada.ca/eng/view/object/?id=33785c9d-b6bc-4a05-bb49-e10e808ed2a2>

<https://publications-cnrc.canada.ca/fra/voir/objet/?id=33785c9d-b6bc-4a05-bb49-e10e808ed2a2>

Access and use of this website and the material on it are subject to the Terms and Conditions set forth at

<https://nrc-publications.canada.ca/eng/copyright>

READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE.

L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site

<https://publications-cnrc.canada.ca/fra/droits>

LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB.

Questions? Contact the NRC Publications Archive team at

PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information.

Vous avez des questions? Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca.



National Research
Council Canada

Conseil national de
recherches Canada

Canada



NATIONAL RESEARCH COUNCIL OF CANADA

DIVISION OF BUILDING RESEARCH

No.

266

TECHNICAL NOTE

NOT FOR PUBLICATION

FOR INTERNAL USE

PREPARED BY J.R. Jutras

CHECKED BY

APPROVED BY N.B.H.

PREPARED FOR General Distribution

DATE September 1958

SUBJECT

The Fire Research Building, Division of
Building Research, N.R.C.

Architect: Meadowcroft & MacKay, Montreal
Resident Architects: G. Koulomzine
D. Hanlon

Consulting Mechanical and Electrical Engineers:
J.P. Keith & Associates, Montreal

General Contractor: Thomas Fuller Construction Co., Ottawa
Superintendent: George Hay

The main building of the Building Research Centre was erected in 1953 to house the Division of Building Research of the National Research Council. Accommodation in this building was not provided for fire research since it was considered that this part of the Division's work could best be carried out in a separate building. After several years of planning during which time several large fire research laboratories were visited, permission was given to begin construction of a Fire Research Building.

This building has been erected on the Montreal Road grounds of the National Research Council immediately opposite the main building of the Division but on the south side of Highway 17. The building was officially dedicated on October 3, 1958, "to the advancement of knowledge in fire prevention and protection".

BASIC LAYOUT

The building, which faces East, takes basically the shape of a large T with offices and laboratories in the front wing, and the large furnace laboratory and a burn area for model studies in the rear wing. One-story additions have been erected on either side of the furnace laboratory to provide storage and workshop facilities, garage space for the station wagon used in field investigations, a control room for the operation of the fire-resistance furnaces, and additional laboratory facilities for hydraulic testing.

The building covers an area of 20,000 square feet and has a total cubage of more than 550,000 cubic feet, of which nearly half is made up of the volume of the 40-ft high structure housing the furnace laboratory and the burn area. The total contract price, including all extras which amounted to less than 4 per cent of the original cost, was \$820,000 or a cost per cubic foot of less than \$1.50. This figure is noteworthy when it is considered that the contract price covered also the construction and equipping of a 100-foot long tunnel connection through which steam and most of the other laboratory services are brought into the building from the power house of the Montreal Road Laboratories.

DESCRIPTION OF THE BUILDING

The building, founded throughout on solid rock, consists of a structural steel frame supported on reinforced concrete. The outside walls, built of structural clay tile, are finished with stucco on metal lath on the outside and with glazed tile on the inside.

1. The Front Wing

The front wing is a two-story structure with a basement. Only the southern half of this wing is fully excavated. It houses all the mechanical and electrical service equipment and will also provide storage space when needed.

Laboratories for small scale experiments and office accommodation for the research staff are located on the first floor. The northern section of this wing provides accommodation for the work which is broadly described as Physics. A general working area, designed to provide a large clear work space has been provided with a large overhead fume hood, centrally located. Work in the ignition of materials by radiation and possibly small-scale model burns will be carried out in this area. Two smaller adjacent laboratories will be used for studies on heat transfer using such apparatus as optical and electrical analogues.

In the south end of this wing the work designated as Chemistry will be carried out. A small chemical engineering laboratory has been specially designed for work in the fire extinguishing field. Its main features are a terrazzo floor with draining facilities for carrying out studies on fire extinguishing foams and a stainless steel fume hood, closed on three sides, under which small-scale tests on flame suppression can be performed. Work on the ignition and combustion properties of materials will be carried out in the main chemistry laboratory, except where constant temperature and humidity conditions are required. A special laboratory, conditioned at 75°F and 50 per cent relative humidity, is available for this type of work, and provides also a dust-free space for balances and special analytical equipment.

An examination room, which can be darkened, has been provided for the examination of materials under an ultra-violet lamp or with other special instruments. It serves also as a dark room for limited photographic work. Also located on the first floor of the front wing are two conditioned rooms for the pre-test conditioning of materials. One of these provides a condition of 50 per cent relative humidity at 75°F and the other provides 15 per cent relative humidity at 75°F, the latter simulating a dry condition found within many heated buildings in winter.

The second floor extends only over the centre section of the front wing covering approximately one-third of the first floor area. Offices for the Section Head and the secretarial staff are located on this floor. It was also found desirable to provide here office space for the personnel charged with the investigations on fires. The main additional features of this area are a conference room, an observation gallery and the library. The conference room providing facilities for meetings of fire officers, technical committee meetings, lecture courses, etc. is large enough to seat groups of over fifty people and is equipped with a demonstration bench and visual aid facilities.

The observation gallery overlooks the large furnace laboratory and makes it possible for visitors to observe fire resistance tests being carried out without interfering with the work on the floor. Certain of the control room instruments might be duplicated in this area.

A small library has been provided as an extension of the divisional library in the Building Research Centre. Reference literature and other material in frequent use by the Fire Section may be kept here. It is used also as a study room for both staff and visitors.

2. The Rear Wing

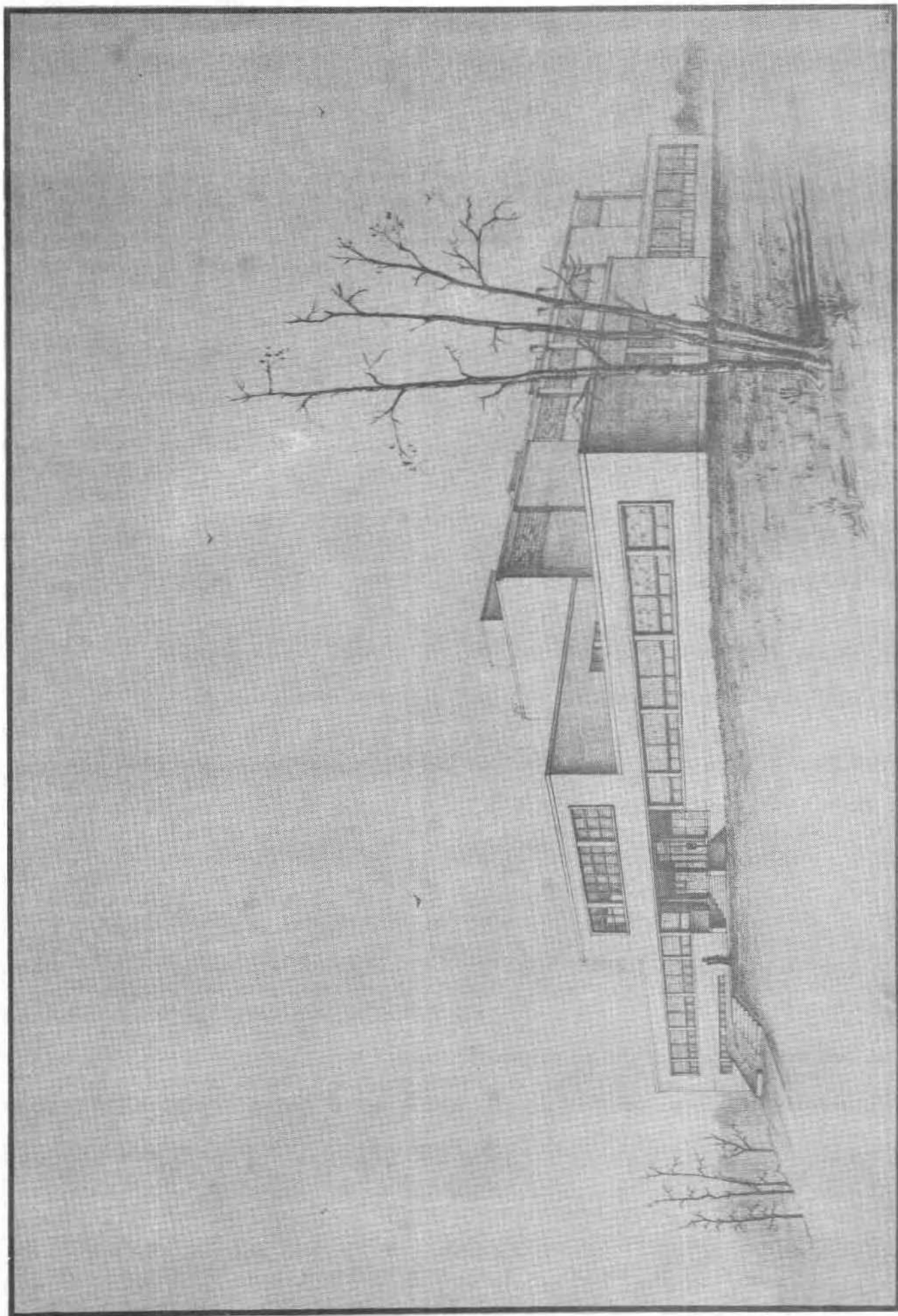
The major portion of the high central part of the building accommodates the furnaces used for the fire resistance testing of wall and floor specimens. These facilities have been described in detail in Technical Note No. 265. At the rear of this furnace laboratory a 40-foot square area, which could be used in future for the expansion of the furnace laboratory, is devoted to model studies. Models of buildings can be burnt in this area in studies of the development of fire.

On the north side of the furnace laboratory facilities have been provided for the work in hydraulics which may include the testing of fire hose and other fire extinguishing equipment using water. The main features of this laboratory are an underground storage tank of 4,000 gallons capacity and a suction well 35 feet deep for use in the testing of pumps.

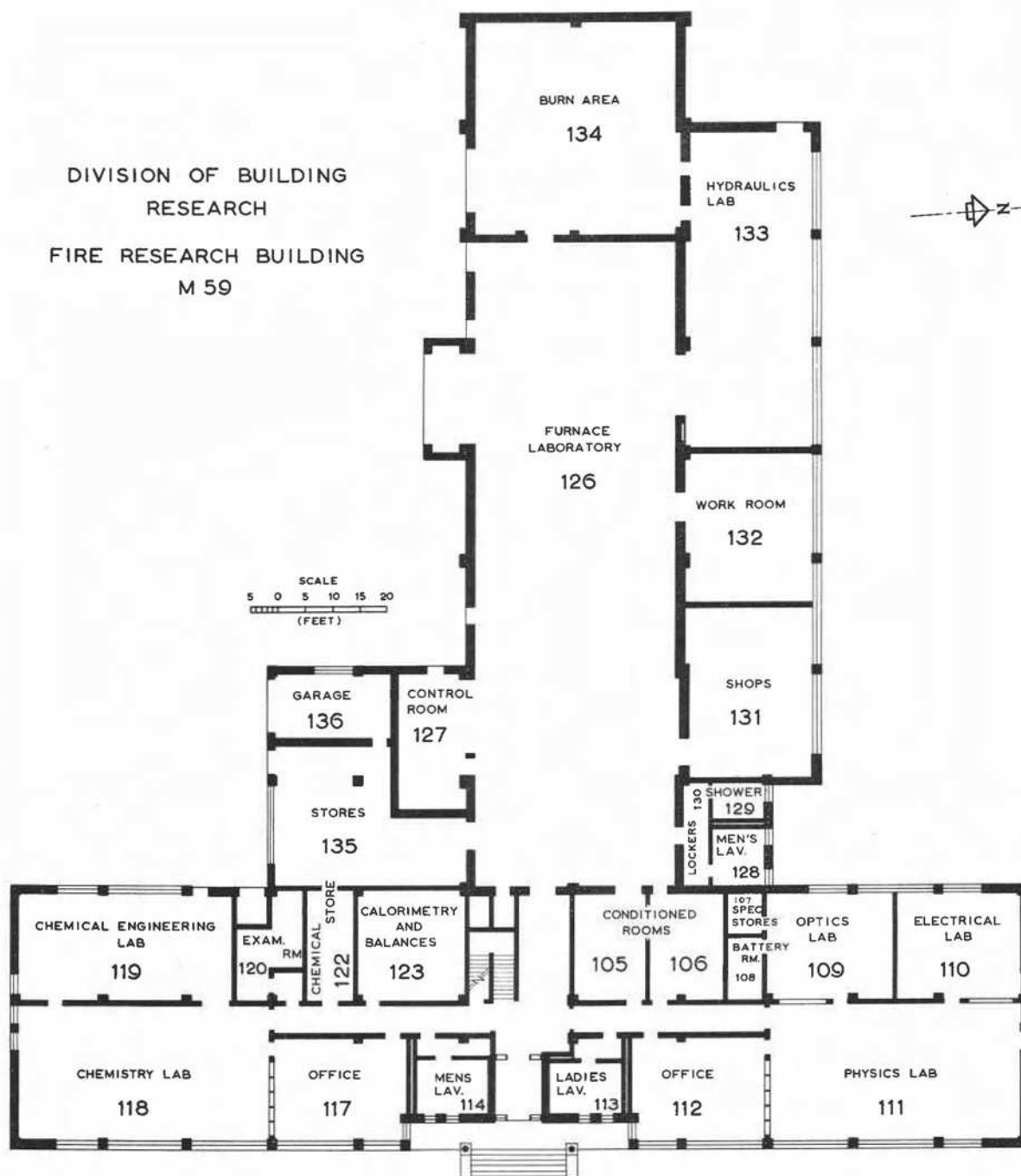
OUTDOOR FACILITIES

The large main door in the south wall of the furnace laboratory opens onto a wide paved yard which provides facilities for the construction and after-test disposal of wall and floor specimens. Behind this to the south there is a large parking area for visitors.

The area to the rear of the Fire Research Building was the site of an old quarry. Its rocky floor, which is at approximately 5 to 10 feet below the level of the surrounding area, provides an excellent outdoor experimental site on which to conduct large-scale tests in fire extinguishment. The area which extends as far as the western limit of the National Research Council grounds is approximately 700 feet long and 200 feet wide and will be surrounded by a security fence. About half of it will be used as an outdoor storage yard and as a materials exposure area for the Division.



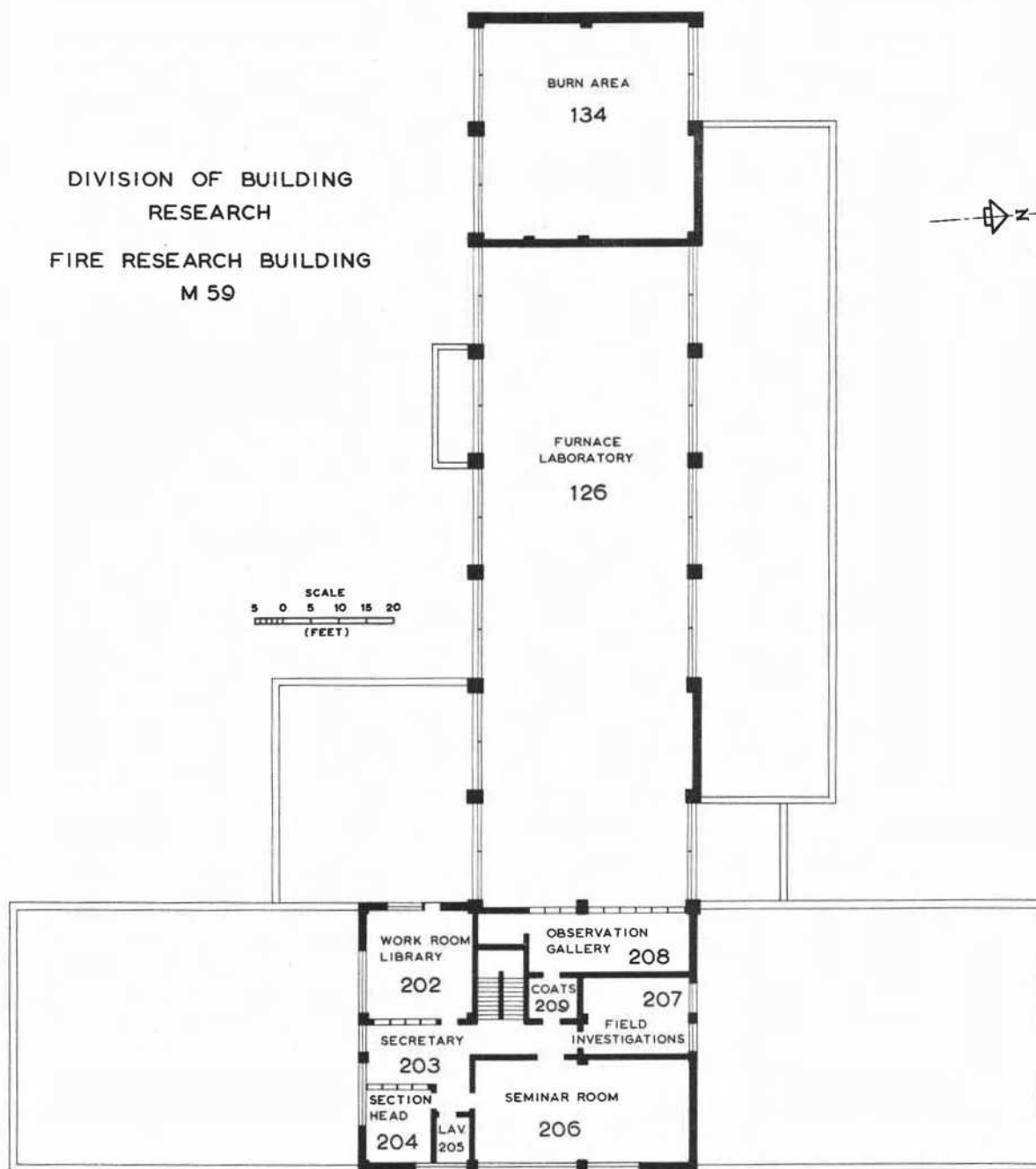
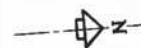
DIVISION OF BUILDING
RESEARCH
FIRE RESEARCH BUILDING
M 59



FIRST FLOOR

DIVISION OF BUILDING
RESEARCH
FIRE RESEARCH BUILDING
M 59

SCALE
5 0 5 10 15 20
(FEET)



SECOND FLOOR