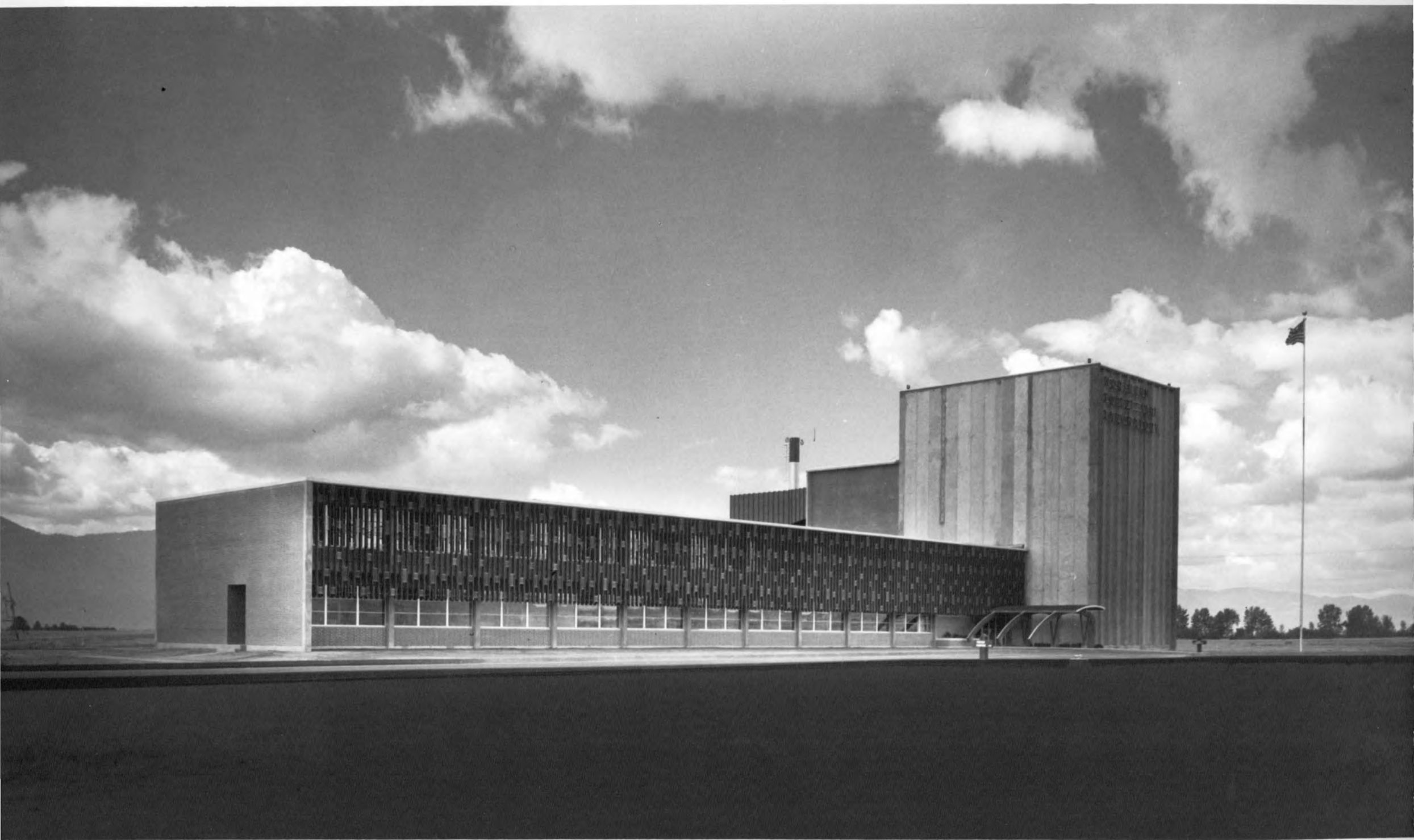


# *The* **NORTHERN FOREST FIRE LABORATORY**

*MISSOULA, MONTANA*



***INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION  
FOREST SERVICE – U.S. DEPARTMENT OF AGRICULTURE***







INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

# NORTHERN FOREST FIRE LABORATORY

- - dedicated to the development  
of knowledge for the protection  
and wise use of America's forest  
heritage - -

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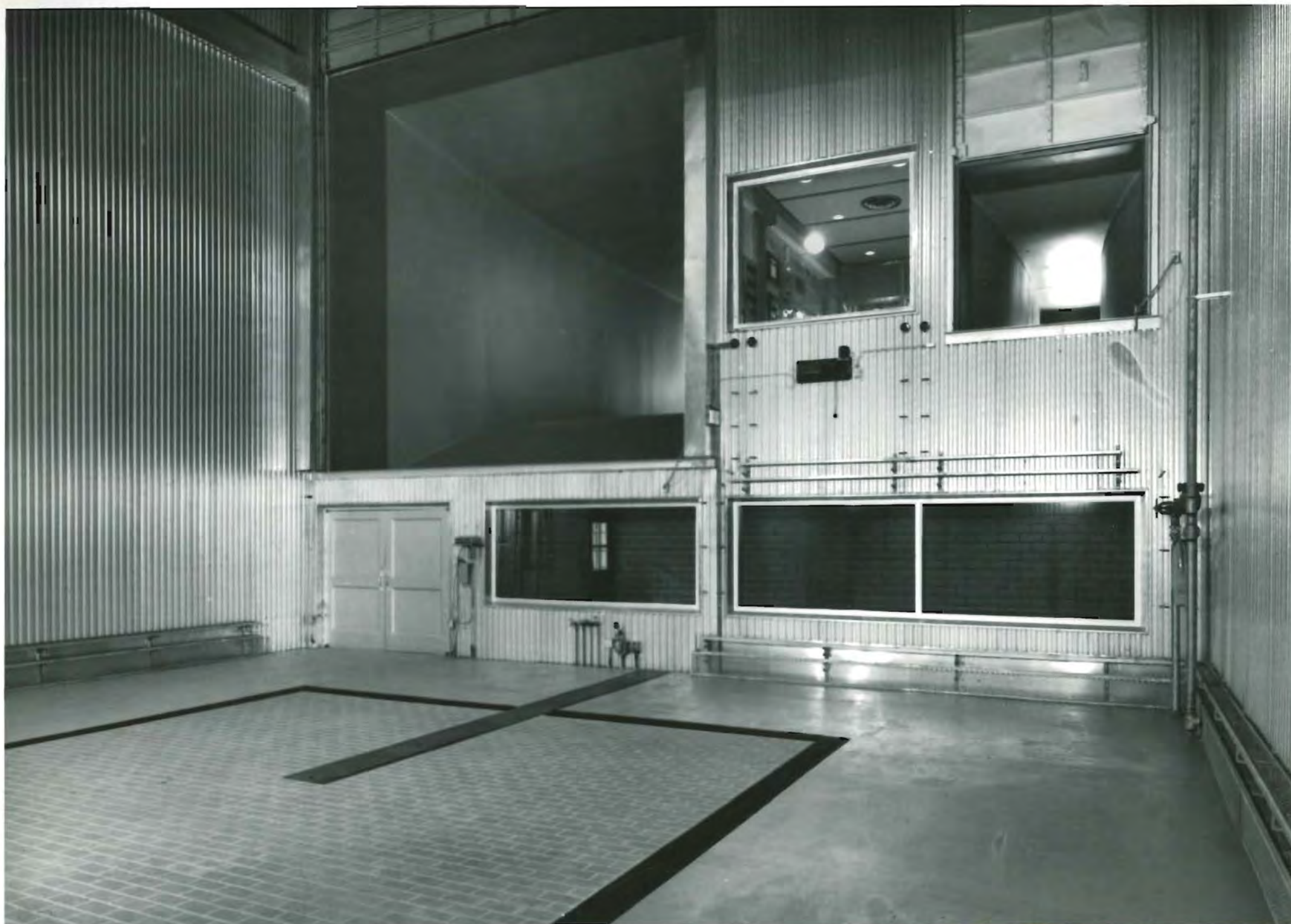
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FOREST SERVICE · U. S. DEPARTMENT OF AGRICULTURE

#### FIRE BEHAVIOR TRAINING

The laboratory is a center of learning in fire science. Forest officers are trained in fire fundamentals at the Northern Forest Fire Laboratory.





#### COMBUSTION LABORATORY

Fire experiments are conducted in this controlled temperature-humidity chamber. Air intake to the low velocity wind tunnel is in the upper left; control room is in the center; air intake to the high velocity tunnel is on the right; viewing room is below.





#### SMALL SCALE LABORATORY FIRES

Knowledge gained from small scale fires in the combustion laboratory may help prevent large costly forest fires.





#### PULSATING FLAMES

The violent flame pulsations, characteristic of some forest fires, are duplicated in the laboratory.





RELATIVE HUMIDITY NINE PERCENT

Although it is March weather outside,  
the combustion laboratory is  
conditioned to typify a hot, dry,  
mid-summer day.



FIRE RESIDUE

Even the ashes of laboratory fires yield research information on fire behavior and control.





BIG FOREST FIRES ARE COSTLY

Information gained from small scale laboratory fires such as those in the preceding photos may supply scientific know-how to prevent disastrous fires.

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#### WIND TUNNELS

The high and low velocity wind tunnels provide key facilities for studying the effect of wind on forest fires.

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FUEL BED FOR WIND TUNNEL

Fire research scientists prepare a pine needle fuel bed on the test platform. The fuel will be burned after being lifted into the wind tunnel.



WIND TUNNEL EXPERIMENT

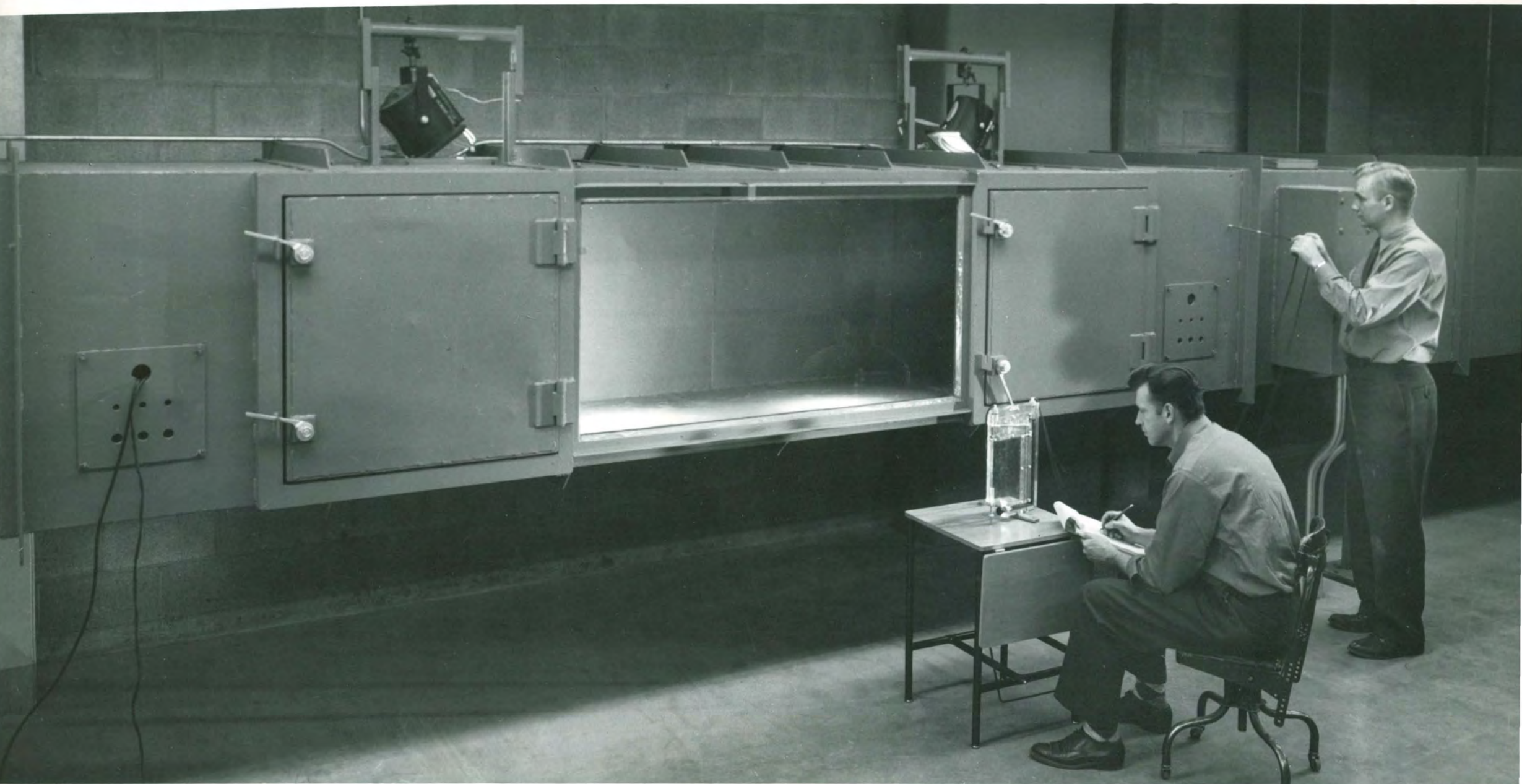
Final preparations are made to burn  
a fuel bed of pine needles in the low  
velocity wind tunnel.



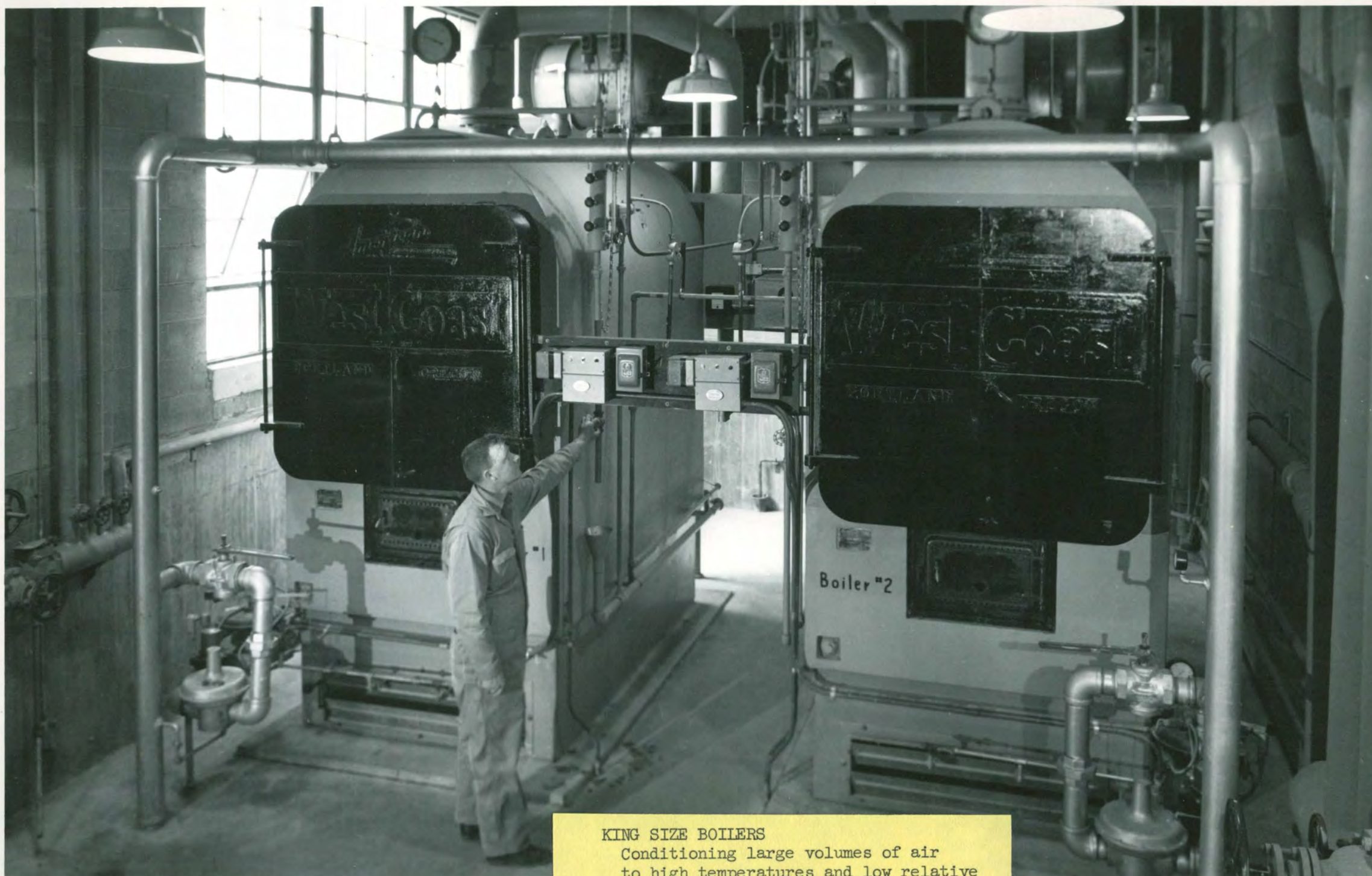


# HIGH WIND SPEEDS

The effects of dangerous winds on fire behavior are studied in the high velocity tunnel.







#### KING SIZE BOILERS

Conditioning large volumes of air to high temperatures and low relative humidities for wind tunnel and combustion laboratory experiments requires a large capacity heating plant.





#### FIRE PHYSICS

Fire research scientists use many types of instruments to record the complex factors of fire environment.



ELECTRONICS

Special electronic instrumentation  
is essential to most phases of fire  
research.



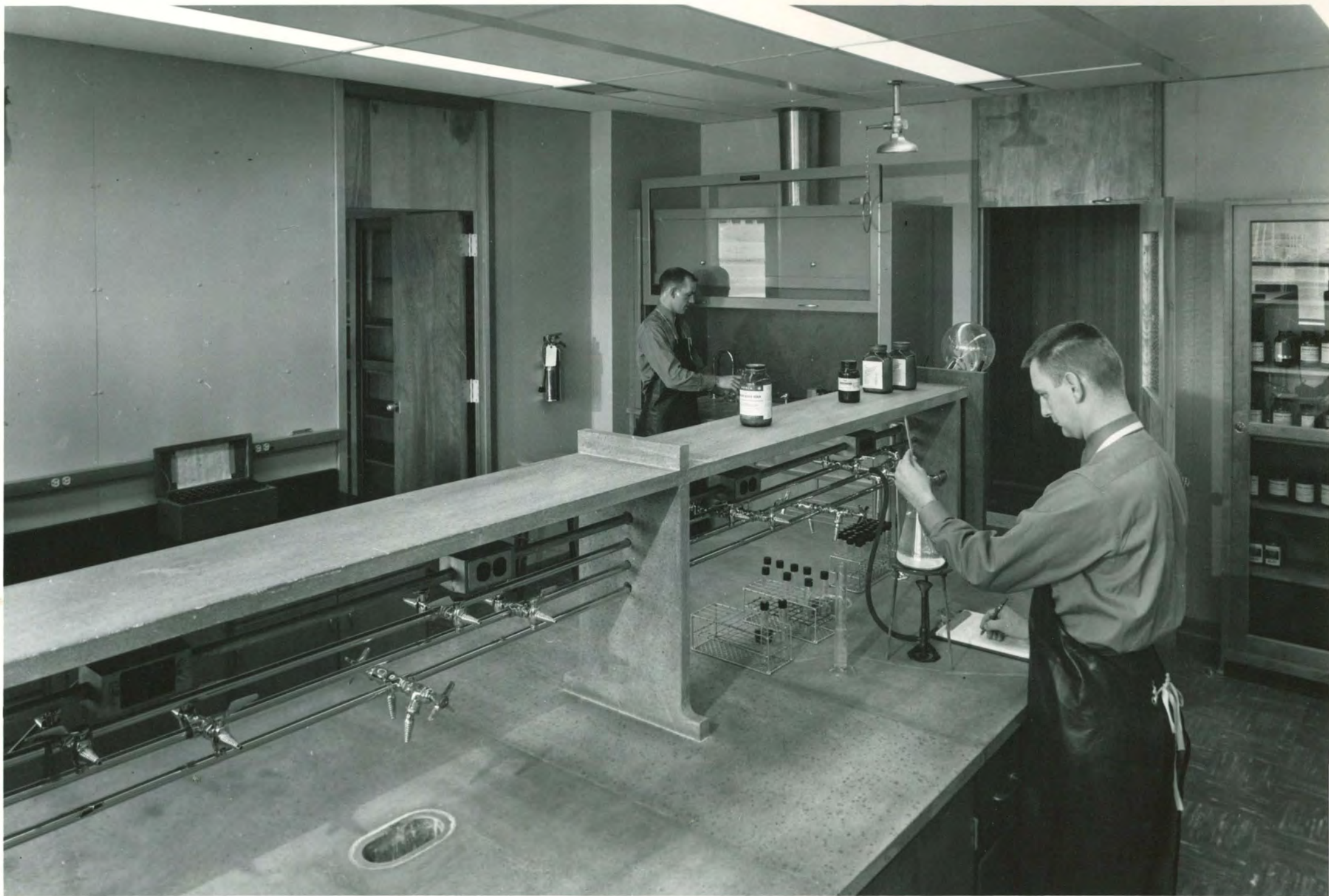




#### FUELS LABORATORY

Fire research scientists use fume hoods, electric ovens, and controlled temperature-humidity cabinets to study the flammability of forest and range fuels.





CHEMISTRY LABORATORY

The chemistry of fire and of fire  
extinguishment may be one of the  
keys to better forest protection.

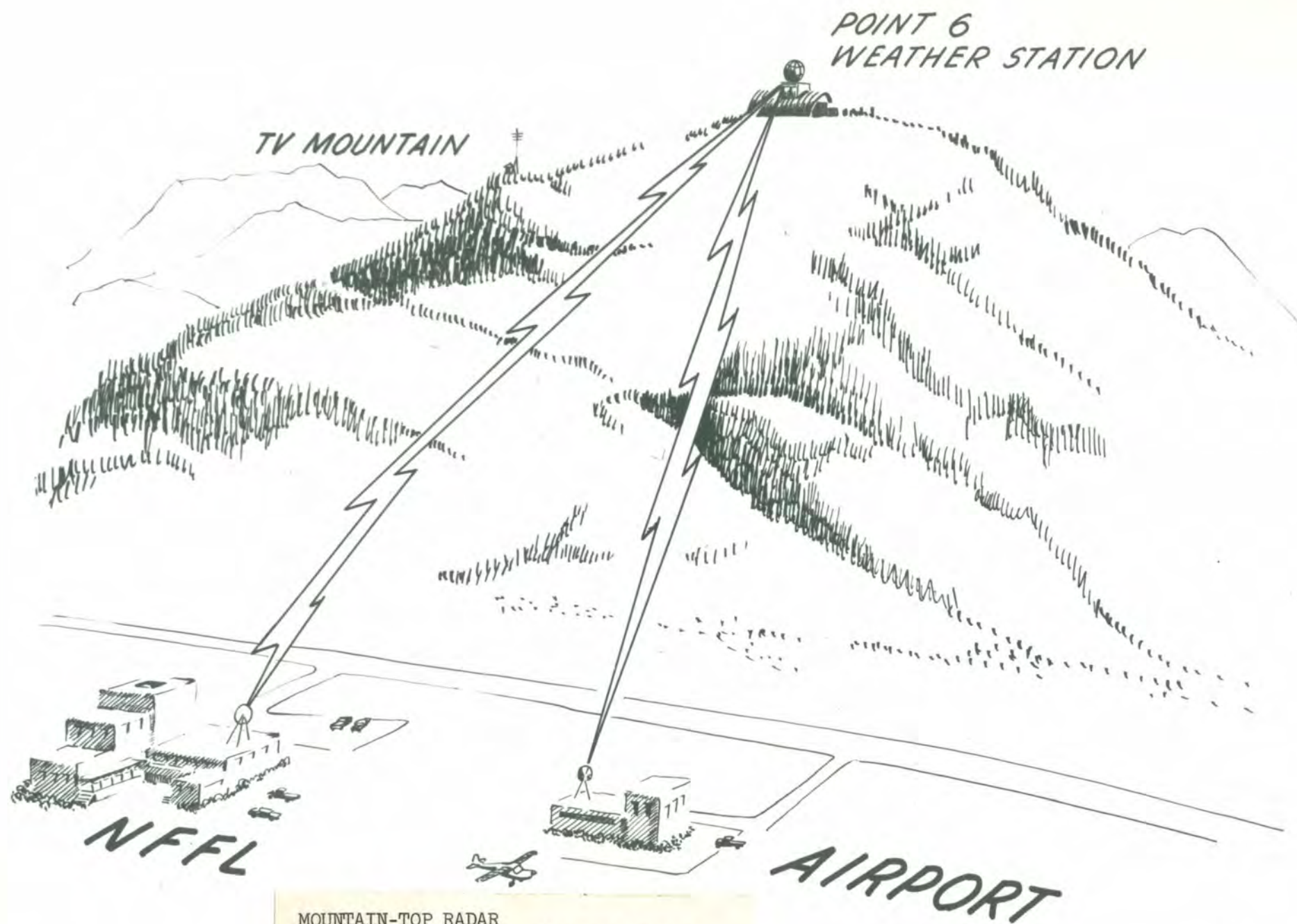




#### FIRE METEOROLOGY

New automatic fire-weather stations are developed to record the natural environment of a forest fire.





#### MOUNTAIN-TOP RADAR

Lightning is the number one forest fire igniter in the mountain West. Radar information for the study of lightning storms will be beamed by micro-wave to the laboratory from the U. S. Weather Bureau mountain-top weather radar station.



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FIRE RESEARCH EQUIPMENT SHOP

Searching investigation of complex forest fire problems requires the development of special research tools.







#### AIRBORNE RESEARCH

Specially instrumented aircraft collect some of the data necessary for establishing the three-dimensional relationship between laboratory model fires and free-burning forest fires.



# FIRE PHOTOGRAPHY

Special photographic techniques are used to record and analyze fire research data.







FIRE SCIENCE LIBRARY

Special books and scientific papers  
provide the fire researcher  
comprehensive information on fire  
and related subjects.





#### TEAMWORK IN FIRE RESEARCH

In forest fire research, as in all fields of basic research, scientists of various disciplines pool their talents in planning and conducting investigations.





#### FIRE CONVECTION COLUMN

The forces influencing forest fires are studied in the combustion laboratory under controlled temperature, humidity, and fuel moisture conditions.





#### FLAMING GASES

Fire research scientists study the flaming gases high above forest fuels burning on the combustion laboratory fire table.





#### LIGHTNING

A multiple strip-chart analyzer in the meteorology laboratory aids the transcription of field data on lightning strikes.





RADAR

Mobile radar units track fire-setting lightning storms over remote forested areas.



# MATHEMATICS

Special data processing and  
computing facilities support  
the basic fire research program





