Mechanical Engineering Building

Dedicated
June 22, 1931

UNIVERSITY OF WISCONSIN
Madison, Wis.
DEDICATION
OF THE
Mechanical Engineering Building
ON
MONDAY, JUNE 22

ANNUAL MEETING
OF THE
Oil and Gas Power Division
OF THE
American Society
OF
Mechanical Engineers
ON
TUESDAY, WEDNESDAY, THURSDAY, FRIDAY
JUNE 23, 24, 25, AND 26
1931

UNIVERSITY OF WISCONSIN
MADISON, WISCONSIN
The
Mechanical Engineering Building
Was Erected by
The State of Wisconsin Pursuant to the
Act of the Fifty-eighth
General Assembly
1927

COMPLETED JUNE, 1931

GOVERNORS OF WISCONSIN
Fred R. Zimmerman  1927-1928
Walter J. Kohler   1929-1930
Philip F. La Follette  1931-

BOARD OF UNIVERSITY REGENTS
1931
Ben F. Faast, Eau Claire, President
Miss Elizabeth A. Waters, Fond du Lac, Vice President
Carl Drexler, Menasha
Gunnar Gundersen, La Crosse
John C. Schmidtmann, Manitowoc
Arthur Sholts, Oregon
Victor P. Richardson, Janesville
Fred H. Clausen, Horicon
Harold M. Wilkie, Madison
Mrs. Meta Berger, Milwaukee
Judge August C. Backus, Milwaukee
Mrs. Clara T. Runge, Baraboo
George W. Mead, Wisconsin Rapids
Herman W. Ullsperger, Sturgeon Bay
Peter Eimon, Superior

John Callahan, State Superintendent of Public Instruction, ex-officio
Glenn Frank, President of the University, ex-officio
Glenn Frank  
*President of the University of Wisconsin*

Frederick E. Turneaure  
*Dean of the College of Engineering*

Gustus L. Larson  
*Chairman of the Mechanical Engineering Course*

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**THE BUILDING WAS DESIGNED**

by  
Arthur Peabody  
*State Architect*

AND CONSTRUCTED BY  
J. H. Findorff & Son  
Madison, Wis.

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**THE BUILDING COMMITTEE**

G. L. Larson, Professor of Steam & Gas Engineering, Chairman, of Steam & Gas Department; Chairman

P. H. Hyland, Associate Professor, Chairman of Machine Design Department.

J. M. Dorrans, Assistant Professor, Superintendent of Machine Shop Laboratories.

L. A. Wilson, Associate Professor, Steam & Gas Engineering Department.

G. C. Wilson, Assistant Professor, In charge of Steam and Gas Laboratory.

D. W. Nelson, Assistant Professor, Steam & Gas Engineering Department.

R. E. Purner, Assistant Professor, Machine Design Dept.

J. W. McNaul, Assistant Professor, Machine Design Dept.

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**THE DEDICATION COMMITTEE**

G. L. Larson, Professor of Steam & Gas Engineering, Chairman.

A. F. Gallistel, Supt. of Building and Grounds.

B. G. Elliott, Professor of Mechanical Engineering, Extension Division.

W. S. Kinne, Professor of Structural Engineering.

J. W. Watson, Professor of Electrical Engineering.

H. L. Ewbank, Associate Professor of Speech.

J. M. Dorrans, Assistant Professor of Mechanical Practice.

J. W. McNaul, Assistant Professor of Machine Design.

G. J. Barker, Assistant Professor of Mining & Metallurgy.
The Dedicatory Exercises
Monday, June 22

2:00 P.M.—Registration of Delegates, Mechanical Engineering Building.

2:00-3:30 P.M.—Inspection of Mechanical Engineering Building.

4:00 P.M.—The Dedication in the University of Wisconsin Field House.

F. E. Turneaure, Dean of College of Engineering, presiding.
Introductory—President Glenn Frank
Address—Regent J. C. Schmidtmann
Address—Governor Philip LaFollette
Dedication Address—L. W. Wallace, Executive Secretary, American Engineering Council.

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7:00 P.M.—Annual Joint Dinner Meeting of Faculty of College of Engineering and Engineer's Society of Milwaukee.

The general subject of talks will be "Industrial Research."

Meeting will be held in Tripp Commons of Memorial Union Building.
PROGRAM OF THE NATIONAL OIL AND GAS POWER MEETING

Tuesday, June 23

Prof. Ben G. Elliott, University of Wisconsin Presiding

8:00 A.M.—Registration.

2:00 P.M.—Welcome to Wisconsin, Prof. Ben G. Elliott.
Dispersion of Oil Sprays,” Prof. K. J. DeJuhasz.
“A Quiescent Combustion Chamber,” J. D. Spanogle.

8:00 P.M.—General Mixer, Party and Entertainment.

Wednesday, June 24

L. H. Morrison, Associate Editor of “Power,” presiding.

9:00 A.M.—Report of Diesel Fuel Research Committee, Wiley Butler, Secretary.
Report of Diesel Power Committee, M. L. Reed, Secretary.
“How to Select a Diesel Engine,” Otto Nonenbruch.
The Disel Engine and the Public,” Roswell Ward.

2:00 P.M.—“Development of Double Acting Diesels,” Louis R. Ford.
Experience With an Automatic Diesel Plant,” Edgar J. Kates.
“Diesel Municipal Light Plants in the Middle West,” C. F. Lambert.

8:00 P.M.—“Development of a High Speed L-Head Diesel Engine,” Max Hoffman.
Observation of European Diesel Developments,”
Lieut. John O. Huse.
“Diesels For Motor Trucks,” Contributed by Verein Deutcher Ingenieure.

—8—
Thursday, June 25

HARTE COOKE, Engineer, McIntosh-Seymore Corp., presiding.

8:30 A.M.—“Application of Oil Engines to Ship Propulsion,”
A. J. C. Robertson.

10:00 P.M.—Leave for works of Fairbanks, Morse & Company.

12:30 P.M.—Lunch and afternoon inspection of Fairbanks,
Morse & Co. Works, Beloit, Wis.

4:30 P.M.—Return to Madison.

7:00 P.M.—Banquet, dance and party, Memorial Union, University of Wisconsin.

Friday, June 26

EDGAR J. KATES, Consulting Engineer, New York City, presiding.

9:00 A.M.—“Piston Packing Problems,” C. K. Sennebaugh.
“Outstanding Municipal Diesel Plants,” C. R. Ruegg.

11:30 A.M.—Formal Closing of Meeting.

1:00 P.M.—Leave for special trip to the Dells of the Wisconsin.
Fig. 2.—Aerial View of University of Wisconsin Campus —Vingé-Russell
Historical Outline

of

Mechanical Engineering

at the

University of Wisconsin

Mechanical Engineering is one of the older branches of the College of Engineering at this institution. It was one of the four original courses at the time the College was established in 1870. Instruction in this course together with that in Civil, Mining, and Metallurgical courses was carried on for the first seven years in Bascom Hall, at that time known as University Hall and the only building on the campus that had class rooms.

The completion of old Science Hall in 1877 provided space for recitation and drafting rooms on the upper floor. One room in the basement was equipped for an engineering laboratory and machine shop. The laboratory was used for tests on steam units, on hydraulic machinery, and materials of construction. In 1884, old Science Hall burned and most of the equipment was destroyed.

During 1887 and 1888, there was considerable building activity on the campus. The present Science Hall together with the present Chemical Engineering Building (then called the Chemistry Building), the present Mining Engineering Building (then the Heating Plant), and the Machine Shop were all constructed during this period. Science Hall provided rooms on the first floor for recitation, lectures, and drafting, while the entire north wing basement was used for an engineering laboratory for classes in steam engineering, hydraulics, and materials testing. All mechanical shop practice, such as machine work, carpentry, patternmaking, and foundry work, was carried on in the Machine Shop. In 1894, the Machine Shop was enlarged not only to provide more space for the increased enrollment but also to provide room for the Testing Laboratory, which was transferred from Science Hall. The Electrical Laboratory, which had previously occupied part of the first floor and basement in the south wing of Science Hall, was also transferred to its present location at that time. Up to this time, Electrical Engineering had been a part of the Physics Department.
The year 1900 marks the completion of the present main Engineering Building. This building provided space for lecture, recitation, drafting, and classrooms for all branches of engineering, together with space for the Steam Laboratory and the Materials Testing Laboratory. In 1910, the building was enlarged by the addition of the northwest wing and a small addition at the rear of the Steam Laboratory.

Throughout the entire history of the Engineering College, the enrollment increased faster than space was provided to care for the larger classes. Additional buildings came at such great intervals of time that the expansion could relieve only a few of the departments. The Shop Laboratories, already cramped for space, were further reduced in 1910 by the necessity for giving space to the Department of Manual Arts. Unsuccessful attempts were made to secure funds for enlarging the shops at this time, and the carpentry shop was moved to the Service Building.

Between the years of 1910 and 1931, the only addition of space that the Engineering College received was the Randall Shop Building. This building (70 x 180 ft.) provided 12,600 square feet of floor space in 1920.

Recent increases in enrollment in mechanical and other engineering courses have caused considerable overcrowding in all laboratories. Moreover, modern development of power and manufacturing machinery has required an expansion of laboratory space in order to include new types of machines. Many new fields of endeavor such as Heating and Ventilation, and Aeronautics have demanded space.

In 1927, a realization of the needs of the Engineering College led to the appropriation by the State Legislature of $577,000 for a Mechanical Engineering Building. The completion of this building will provide amply for the departments of Mechanical Engineering. The space vacated by these departments will partially relieve the cramped condition of a few of the other departments of engineering.
The Mechanical Engineering Building

Location of Building

The location of the new building, facing north on University Avenue, marks the beginning of the removal of the Engineering College from its present site on Lake Mendota to Camp Randall. Fig. 1 shows an aeroplane view of the front of the building and its location with respect to the Stadium and the new Field House. The building is three stories high and was built completely around the Randall Shop Building. The picture on the cover shows another aeroplane view of the building. Fig. 2 shows a view of the building from the opposite corner with The Campus, University Buildings, and Lake Mendota in the background.

The building committee, working with Prof. G. L. Larson as chairman and under the direction of Dean F. E. Turneaure, made a careful survey of the possibilities for expansion in the present area. It was estimated that this location would provide for only fifteen year's expansion and such a plan did not go far enough into the future to satisfy the Board of Regents. Mr. Peabody,
state architect, had already foreseen this possibility and had reserved the north end of Camp Randall for a future Engineering Group of some eight or nine buildings. The future location of the Engineering College, bounded by Randall Avenue, Breese Terrace, University Avenue, and the Stadium, has been approved by the Board of Regents. It is hoped that the complete transfer of the Engineering College will require a period of not more than twenty years.

Architectural Details

The building conforms to a modernized Italian Renaissance style of architecture. A front view is shown in Fig. 3 and a detail of one end of the front section in Fig. 4. The building walls are of Madison stone, except the central portion of the front and the architectural trimming which is terra cotta.

The east wing of the building provides for the needs of the Steam and Gas Laboratories, while the west wing houses the Engineering Shop Laboratories. Drafting rooms and offices for the Machine Design Department are in the front of the building on the third floor. The building is exceptionally well lighted throughout. The floors are hard maple except in some of the laboratories. The engine laboratories, boiler room, foundry, and forge room all have concrete floors. Wash and locker rooms are conveniently connected with each of the main laboratories in order to save time and confusion. Wherever the laboratory work involves the creation of dust, fumes or smoke, provision has been made to collect them as near their source as possible and carry them away by special exhaust systems. A ventilating fan located in the attic supplies air to all class and drafting rooms. The main lecture room is equipped with unit ventilators. The entire building has dual temperature heat control in each room so that at night, the room temperature is less than it is during the day time.
Fig. 4.—Detail of End of Front Section

—Vinge-Russell
Convention Lobby and Display Space

The meeting and display lobby in the front of the building is shown on the first and second floor plans, Fig. 5 and 6. This space extends through two floors to form a balcony on the second floor. This arrangement is shown by a view from the first floor in Fig. 7 and a view from the second floor balcony, Fig. 8. A ring hanging from the ceiling in Fig. 8 shows where a Wright Whirlwind Motored Fighting Type Aeroplane now hangs for exhibit purposes.

Fig. 5.
There has always been a great need for a general meeting lobby for technical meetings and conventions and for space where models and sections of engineering apparatus could be placed on display for the benefit of students and the public in general. Already the department has received many extremely interesting models of various types of modern machinery. The wall space will be used for photographs and drawings. Framed etchings of thirty noted Engineers and Scientists have been presented by the Engineers' Society of Milwaukee.

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In the background of the picture of the main floor lobby (Fig. 7) is shown an archway entrance to the lecture room which has a permanent seating capacity for 154 people. This room is shown on the first floor plan, Fig. 6. The A.S.M.E. Student Branch headquarters and meeting room is also shown on this plan.

![Image of the main lobby](image)

**Fig. 7.—The Main Lobby**

---Vinge-Russell

**Student Lounging Room**

In the front part of the building on the second floor, Fig. 6, there has been provided a student lounging room. For some time, it has been the feeling among the engineering faculty that there was too little opportunity outside of classes for the engineering students to become acquainted with each other. This room will provide a meeting place for students where social contacts may be made during any open hours between classes.

**Machine Design**

The sophomore and junior drafting classes will use the two large drafting rooms in the front section of the building (Fig. 9). These rooms have a north exposure and the lighting is especially good. The senior drafting room is in the front of the east wing.

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on the same floor. Fig. 10 shows a picture of this room with the sliding black board arrangement. This permits holding over black board information from one period to the next for three different classes.

In addition to the drafting rooms and offices on the third floor, the Machine Design Department has a thirty by forty foot labo-

**Fig. 8—Balcony of Main Lobby—Vinge-Russell**

-19-
atory in the basement under the Steam Laboratory Work Room. Various tests of power transmission and machine design will be conducted in this laboratory. Floor slots have been provided for convenience in arranging machines for test.

*Steam and Gas Engine Laboratory*

The Steam and Internal-Combustion Engine Laboratory extends two stories in height from the first floor, Fig. 5. A view of this room from the rear balcony is shown in Fig. 11. This picture also shows the three-motor, five-ton crane, the condenser pit, and a portion of the slotted floor. There are a driveway and large doors so that a truck may back into the condenser pit to be unloaded by the crane. The steam units will be installed in a single row along the condenser pit with ample clearance between machines so that efficiency tests may be conducted simultaneously by several class groups without any interference or crowding. A special data table will be used for each large engine. There will be a locker in each end of these tables which will furnish convenient places for all the test apparatus needed by the class and all the special tools belonging to the engine.

The main foundations have been separated from the rest of the floor in order to minimize the amount of vibration transmitted to the building. The walls are of tan colored, smooth face-brick. Large power-plant-type windows provide an abundance of light.

In the back part of the Steam and Gas Engine Laboratory, three of the large internal combustion engines will be set permanently. Other units will be set on the floor-slots. This scheme affords an easy method for making temporary installations. A large number of modern engines can thus be tested on a loan basis.

Balconies at each end of the main laboratory provide space for class work and special testing work. At the north end is the Calibration Laboratory where gages and indicators will be tested for accuracy. At the south end a completely equipped Oil Testing Laboratory serves for both class and research studies. There are several other rooms connecting to the main laboratory. The convenient location of the tool room and work shop, the wash and locker rooms, and the apparatus storage rooms is shown on the first floor plan, Fig. 5.
Automotive Laboratory

The high-speed, internal-combustion-engine test work will be conducted in the basement under the south end of the east wing. This laboratory is well lighted by full height windows and a grade line low enough to expose a large portion of the outside walls. Some of the equipment will be installed during the summer months. The present 150-hp. electric dynamometer will be mounted on a movable truck to operate on the track provided in the concrete.
floor. This scheme will make it possible to shift quickly from one engine set-up to another. Space is provided for another such dynamometer arrangement for testing airplane engines. A pit has been constructed so that a chassis-testing dynamometer can easily be installed. Such an arrangement permits running a test on an automobile by driving the loading mechanism with the rear wheels. Exhaust pits, vent stacks, and chimneys have been built into the building.

Boiler Laboratory

A Boiler Room joins the Heating and Ventilating Laboratory to the Steam Laboratory, Fig. 5. This room extends two stories in height from the basement floor level. It will house both heating and power boilers for efficiency testing purposes. Space has been provided for a high-pressure boiler which can be fired in a variety of ways with either liquid or solid fuels. Several kinds and types of boiler plant auxiliaries will also be arranged for experimental and research work. Heat for the building is supplied from the University Heating Plant, and connection to the tunnel system is made in one corner of the Boiler Room. The top of this tunnel entrance room will be used as a water-weighing gallery.

Heating, Ventilating and Refrigerating Laboratory

The Heating, Ventilating and Refrigerating Laboratory will be located in the rear portion of what used to be Randall Shop. This furnishes a good solid floor for moving heavy equipment such as brick or concrete wall sections which are used in connection with the test work on "The Infiltration of Air Into Buildings." Fan testing, air measurement, heat transmission, and refrigeration experimental and test work will also be carried on in this laboratory. The increase in space for carrying on work in this branch of mechanical engineering will enable the University of Wisconsin to take part in the establishment of test codes and standards for all heating, ventilating and refrigeration equipment.

In addition to the heating and ventilating apparatus in this laboratory, the heating system of the building will be used for practical studies. A variety of systems and combinations of heating and ventilating equipment have been installed in different parts of the building.
Machine Shop Laboratory

On the first floor of the west wing is a modern and conveniently arranged machine shop, Fig. 5. It has been carefully planned to meet practical and safety requirements and also facilitate instruction. The machines of one particular type have been grouped together and are belt driven from overhead shafting.

The walls in this room, as in all the shop laboratories, are common brick, painted with a good light-reflecting paint. The floors are of heavy maple. The only elevator in the building is located in this wing. It serves both as a freight elevator for the building and as a service elevator for the foundry.

Foundry Laboratory

The foundry is on the second floor at the rear of the west wing, (Fig. 6) and extends through the third floor to the roof of the building. Figure 12 shows a photograph of the south end of this room, where the cupola charging floor is located. A balcony extends along the west side to the Forge Shop. This connected the entire third floor to the elevator shaft so that supplies and equip-
ment can be trucked to any part of the building from the one elevator. Provision has been made for modern equipment, so that when the installation of apparatus is complete, there will be a variety of moulding machines, sand blasts, air hammers, sand mixers, and core ovens. The melting of iron will be done in a cupola thirty-six inches in diameter. The conveying and pouring of molten metal will be simplified by the overhead, three-motor, two-ton crane.

Woodworking Laboratories

On the second floor, adjoining the foundry (Fig. 6), is the Carpentry Shop Laboratory and adjoining that is the Pattern Shop Laboratory. The purpose of these laboratories is to teach the students to make patterns for the casting moulds which are to be made later in the foundry. All the woodworking machines will be motor driven and the wood lathes will be arranged with group drive.

Fig. 11.—The Engine Laboratory —Vinge-Russell

Forging Laboratory

On the third floor, adjoining the foundry (Fig. 9), is the Forge Room. The forges are arranged in two rows with air-blast and

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plan for the mechanician shop in the front part of what used to be Randall Shop. There will be an instrument room for fine work which will be partitioned from main shop where the benches and large metal working machinery are to be located. There will be a good-sized stock room and a tool room opening directly into the main shop.

Research Facilities

One of the greatest needs of the Engineering College in the past few years has been for a few rooms where research could be carried on by students and faculty. It is quite essential that apparatus and set-ups for such work should be locked up when the investigator cannot be present. This is especially needed in this College; for, in general the faculty spends only part time on research. Three research rooms are shown in the photograph of Fig. 13. These rooms are at the south end of the east wing on the third floor, Fig. 9. An overhead beam electric hoist and a floor opening make it easy to take machinery or equipment in and out of these rooms. The arrangement of the hinged transom doors and removable transom bar is shown in the photograph, Fig. 13. These rooms are all equipped with black boards for group discussion of any project.

Fig. 13.—Research Room

—Vinge-Russell—
exhaust ducts carried on the ceiling of the floor below. The room is well vented to carry off any fumes or gases.

Welding Laboratory

The Welding Laboratory is in the west wing on the third floor (Fig. 9) just in front of the Forge Room. This laboratory is fully equipped for instruction and research in acetylene gas, city gas, and electric welding. The skylights are provided with screens for darkening the room.

Sheet Metal Laboratory

The Sheet Metal Laboratory, in the front corner of the west wing, (Fig. 9), is arranged for instruction in a variety of fields such as pipe fitting, soldering and general sheet metal work.

Mechanician Repair Shop

All the repair work and a large part of the construction of special apparatus for the Engineering College is done in the Mechanician Department. The first-floor plan, Fig. 5, shows
Cooperative Research

The completion of the Mechanical Engineering Building not only improves the teaching facilities and encourages research work, but it also makes it possible to enter into the more extensive research projects. It furnishes an excellent laboratory where engineering data can be obtained which is of great value to the people of this state as well as other states.

The matter of decreasing fuel bills by finding the ways of preventing heat loss from residences and public buildings has received special attention by the Department of Steam and Gas Engineering.

During cold and windy weather, a large amount of heat is carried away from a building by the air that leaks in on one side and out the other side of the building. Certain types of construction are much more effective than others in the matter of reducing the quantity of heat lost in this manner.

During the past four years, in cooperation with the American Society of Heating and Ventilating Engineers, a study has been made of the problem of air infiltration or leakage through buildings. The lack of space for such work has seriously hampered the progress of this investigation. Even so, many phases of the subject have been investigated and the data made available to architects and others interested in building construction. Complete studies have been made upon the infiltration of air through masonry walls, through wood frame walls and through double-hung wood windows. A total of nine masonry wall sections have been built and tested under various conditions. The wood-frame wall sections were built and tested in steps so that the effect of adding each layer to the construction would be known. Over forty variations of walls were studied for air infiltration. The most recently completed program was that covering the leakage through both plain and weatherstripped double hung wood windows when fitted with various clearances.

The above projects were carried on in a laboratory with the aid of testing equipment for exerting a pressure against the window or wall section. In order to find the relation of these laboratory results to the variable conditions in buildings, experiments are being made as to the behavior of air movements into and out of actual buildings. One study is on the variation of the ventilation with open windows under the influence of variable winds. An-
other phase yet to be investigated is the influence of a positive means of ventilation, such as a central fan system or unit ventilators on the air leakage around building openings. Still another subject to be investigated is the effectiveness and the development of a method for rating roof ventilators. With the increased facilities that this new building offers, it is hoped that these projects and many others in all branches of Mechanical Engineering can be carried on in just as successful a manner.
## Distribution of Floor Space

### By Departments

<table>
<thead>
<tr>
<th>Departments</th>
<th>Floor Space—Sq. Ft.</th>
<th>Per Cent New of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Bldg. &amp; Randall</td>
<td>Entire Bldg.</td>
</tr>
<tr>
<td>General</td>
<td>10,970</td>
<td>11.5</td>
</tr>
<tr>
<td>Machine Design</td>
<td>7,770</td>
<td>8.2</td>
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<tr>
<td>Machine Shop</td>
<td>36,630</td>
<td>38.7</td>
</tr>
<tr>
<td>Steam &amp; Gas</td>
<td>33,890</td>
<td>35.8</td>
</tr>
<tr>
<td>Mechanician</td>
<td>5,500</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94,760</strong></td>
<td><strong>100.0</strong></td>
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### By Utility of Space

<table>
<thead>
<tr>
<th>Use of Space</th>
<th>No. of Rooms</th>
<th>Floor Space</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Sq. Feet</td>
</tr>
<tr>
<td>General Laboratories</td>
<td>16</td>
<td>51,380</td>
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<tr>
<td>Research Laboratories</td>
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<tr>
<td>Lab. Work Shops, Tool Rooms, etc.</td>
<td>19</td>
<td>5,060</td>
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<tr>
<td>Basement Storage</td>
<td>3</td>
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<tr>
<td>Lobby and Display</td>
<td>2</td>
<td>4,270</td>
</tr>
<tr>
<td>Student Rooms—(A.S.M.E., Lounge,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.)</td>
<td>4</td>
<td>1,765</td>
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<tr>
<td>Drafting Rooms</td>
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<td>Lecture Rooms</td>
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<td>Class Rooms</td>
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<tr>
<td>Computation Rooms</td>
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<tr>
<td>Offices</td>
<td>26</td>
<td>4,691</td>
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<tr>
<td>Filing Rooms for Offices and Class</td>
<td>6</td>
<td>411</td>
</tr>
<tr>
<td>Toilet and Locker Rooms</td>
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<td>3,510</td>
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<tr>
<td>Janitor Space</td>
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<td>565</td>
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<tr>
<td>Mechanician</td>
<td></td>
<td>5,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>94,760</strong></td>
</tr>
</tbody>
</table>

*Note: This total includes the 11,030 sq. ft. of net space at Randall Shop. In addition to the 94,760 sq. ft. of space, there is 4,950 sq. ft. of attic space and 1,430 sq. ft. of front basement space which is not especially valuable except for future storage. It was added by the architect as a convenience in working out the exterior design. The addition of this 6,380 sq. ft. gives a grand total of 101,140 sq. ft. of which 90,110 sq. ft. is in the new building.*

—Photos by Vinge & Russell.