A Building for the Department of Practical Mechanics at Purdue University.

By M. J. Golden.

The building was designed for the purpose of providing laboratories in which to teach students of engineering, shop practice and mechanical drawing, and is meant to accommodate three hundred students in the shops and three hundred students in the drawing rooms at one time. The mechanical drawing taught is the usual elementary drawing that precedes engineering design, and includes descriptive geometry. The shop practice includes manual training and practice in the methods employed in manufacturing where special tools and labor saving devices are used; this involving arrangements in the shops for demonstration work before groups of students.

The principal conditions necessary for the proper carrying on of such

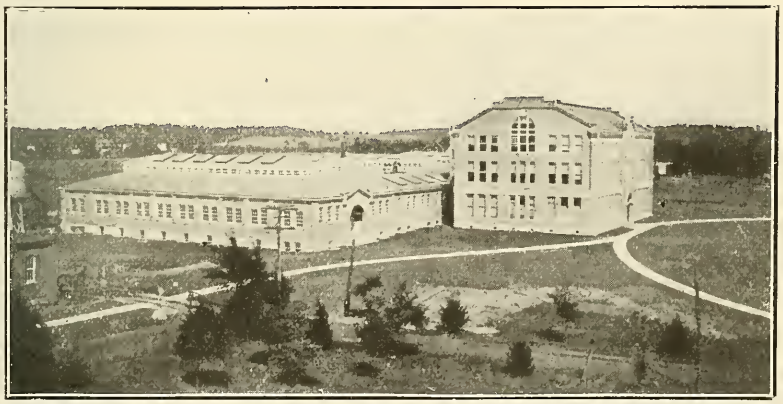
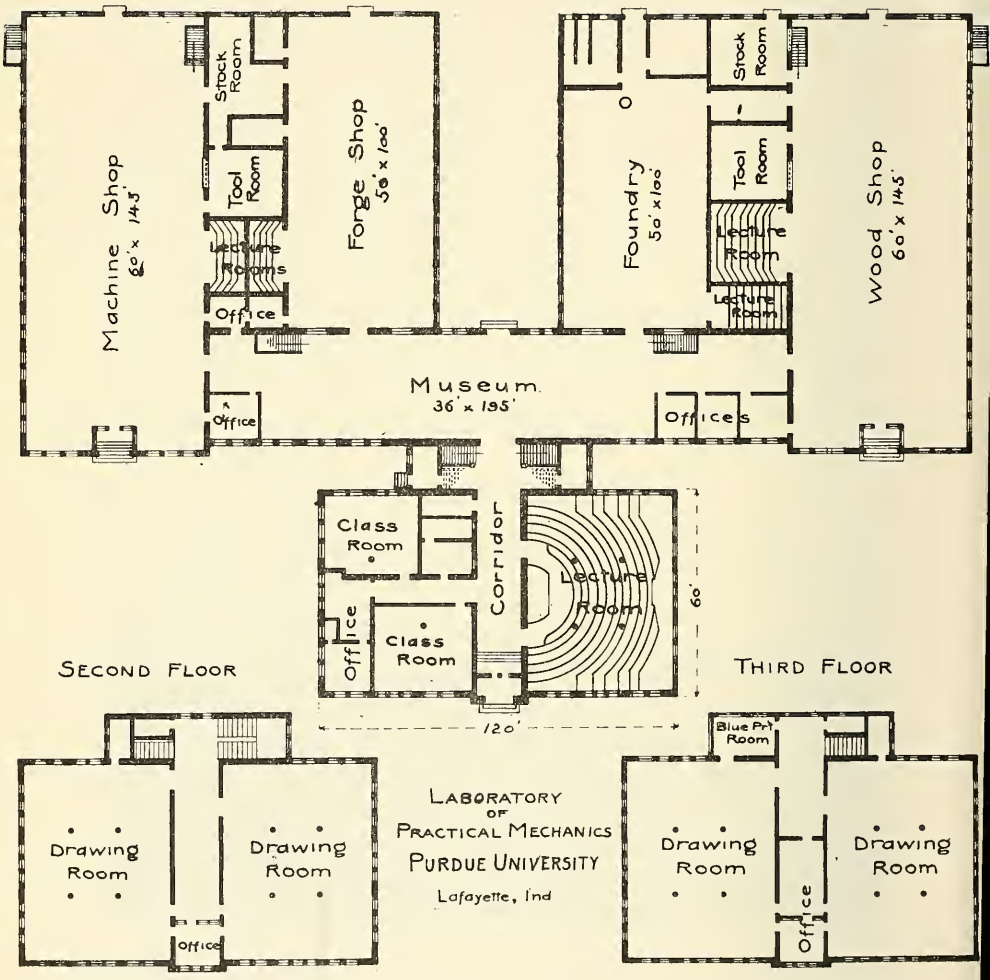


Fig. 1.

work are ample light, proper ventilation, and careful regulation of the temperature.

The building is of common brick with stone trimming and the design was purposely made to be as simple as possible, as befits a structure for such purpose. The general appearance is shown in Fig. 1.



LABORATORY
OF
PRACTICAL MECHANICS
PURDUE UNIVERSITY
Lafayette, Ind

It consists of a three story front in which are the drawing rooms, lecture and class rooms, and offices, and a series of one story rooms for the shops; the separate shops are bound together and to the front by a large corridor that serves also for museum purposes.

LIGHTING.

Considering the lighting first, the effort was to have as much lighting from the sky as possible; and as the large area of the roof made a troublesome accumulation of snow probable at times, a sloping roof with small pitch was taken and large skylights used to give the desired openings. These openings are glazed with a maze glass that is reinforced with wire netting, and this has been found to give a light distribution that is satisfactory. The saw-tooth form of roof was discarded in the design because of the possible snow accumulation in the valleys. The skylights are used in all the shops and for the drawing rooms in the third story of the front. In the rooms in the front where skylighting cannot be used, the windows are made to extend to the ceiling and to be as large as safe wall construction will permit.

The artificial lighting is principally by 60 C. P. incandescent lamps. In the drawing rooms these are arranged in groups of four close under a whitened ceiling. This arrangement is used also in the lecture rooms, the forge shop and foundry. In the machine shop the arrangement is supplemented by individual lights at the ends of arms made of flexible tubing, and in the wood-working room, mercury vapor arcs are used for the ceiling lights, with the individual lamps at the benches and lathes. In the wash and toilet rooms the light is distributed by individual ceiling lamps.

HEATING AND VENTILATION.

It was considered desirable that the heating and ventilating be by separate systems. The heating is done by radiation from steam heated radiators that have automatic control. These are coils of pipe that are suspended from the ceiling in some portions of the shops and wall radiators in other parts, and in the front portion of the building. The steam is generated in the central heating plant of the University, and is brought to the building in covered pipes in a tunnel.

The ventilation is accomplished by taking air from outside the building and after passing it over steam heated pipes in a chamber in the basement, where it is tempered to 67° F., forcing it through ducts in the walls

and distributing it over the building. In the shops the distribution is through sheet metal pipes that are suspended against the upper portion of the side walls. The temperature is controlled by a regulating device in the heating chamber. By this scheme the ventilating apparatus can be closed to any portion of the building not in use. It may be used also as a supplementary heating system in severe winter weather.

POWER.

The electric current used for power and lighting is generated in a plant that is about three hundred yards away from the nearest point in the shops. It is of the alternating kind and is brought to the building at a tension of twenty-two hundred volts and is then stepped down to two hundred twenty volts in a transformer that is placed just outside of, and in the rear of the shops. The portion used for power purposes is carried to a number of small motors that run groups of the machines or that run individual machines; there are seventeen groups in all besides the individually driven machines.

In the wood working shop it has been possible to place the motors in the basement, and this is especially desirable in wood working, as it tends to freedom from dust. This was not possible in the machine shop, because of the design of the driving heads of ordinary machine tools.

The general arrangement of the building is shown in Fig. 2, where the floor area devoted to the various purposes is shown, also.

Adjacent to every one of the shops there is a room for demonstration purposes. This is arranged so that a machine may be conveyed from its place on the shop floor and used during the exposition of its purposes. Power for this purpose is brought to these class rooms; and to furnish current for the projection lantern in the large lecture room, there is a separate set of wires from the power house, bringing a direct low tension current. This low tension current is carried at one hundred ten volts.

CONVENIENCES.

The basement under the main corridor has the locker and toilet rooms; a battery of forty wash basins supplied with hot and cold water, and rows of metal lockers are arranged at each end. There are individual lockers for eight hundred fifty students, in which they keep their work clothes. In the shops there are also separate lockers for eight hundred fifty students, in which the material on which they are working is placed when not in use.

The drawing rooms are furnished with corresponding lockers and other facilities for the apparatus used in drawing. In the third story are two rooms for blue printing and corresponding work. One room is arranged for sun printing and has sheets of plate glass in an exposing wall on one side. There are the usual printing frames. The other room has no outside wall and is fitted with a blue-printing machine in which exposure is made to a rise and fall electric arc. The washing and drying of the prints are done in the sun printing room.

There are two dark rooms for photographic work.